Engineering Library

MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN

JAN 14 1941

A CHILTON PUBLICATION

ANUARY 1941

N THIS ISSUE

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ission Overhaul
y Bill Toboldt

urret Top Repairs
y Clarence C.
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heel Alinement
n Nash 4140

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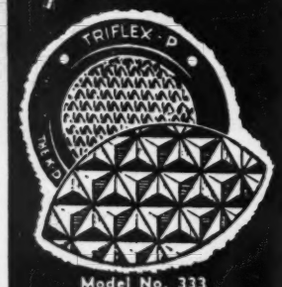

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MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL

FOR AUTOMOTIVE SERVICEMEN

Vol. LX, No. 2 — January, 1941

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Executive Offices
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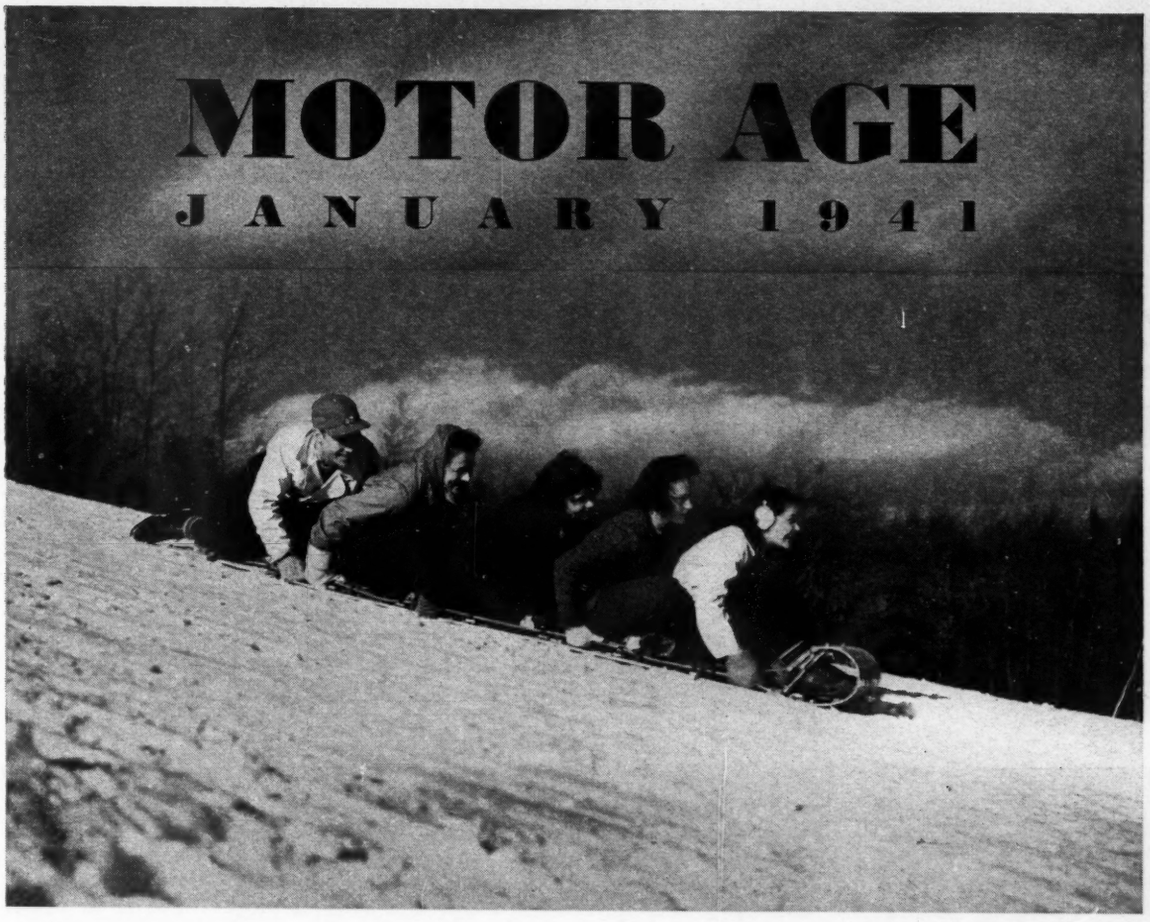

Shop Talk

By Bill Toboldt

Coasting

When the thermometer is down around zero and there is snow on the ground it's a lot of fun to go coasting down the hills. But in the automotive business you can't afford to do any coasting. If you do, you'll wake up some morning and find that some alert competitor who isn't afraid of work and is willing to adopt new maintenance methods and do a good job of merchandising, has taken your business away from you.

Assist

Way back in January, 1940, Herman Godbey of Salem, Mo., was having some trouble with a McCormack-Deering tractor. In spite of a lot of work and new parts it still wouldn't perk. I suggested timing, but it took A. O. Wilson of Tingle's Garage in Forsyth, Ga., (the State of peaches) to shoot the trouble. A. O., whose letter just reached me, stated that on reading of the trouble, he wrote Herman that the trouble was caused by an accumulation of carbon in the intake manifold. Just burn out the carbon with oxygen, advised A. O. and the trouble was licked, just like that. Many thanks for the assist, Wilson.

Defense

Repair men would make good supervisors in the National Defense program, suggests Cliff Opel, who you will recall hails from Duluth. His complete letter appears elsewhere in this issue. It would seem that Cliff's and my mind have been working in the same groove for also in this same issue you will find the first of a series of articles which will help repairmen to become familiar with radial engines which are used so extensively in airplanes and tractors. These articles are designed to lay the ground work for the mechanics so that at least they will know their way around when they get in the service.

Chicago

Two things that impressed me at the Chicago parts show were the number of quick battery chargers on the market and the tendency of some of the equipment manufacturers to offer low priced wheel alining equipment. The quick chargers are certainly upsetting the battery charging field and the low priced wheel alining equipment is enabling a lot more shops to get started in this phase of the business.

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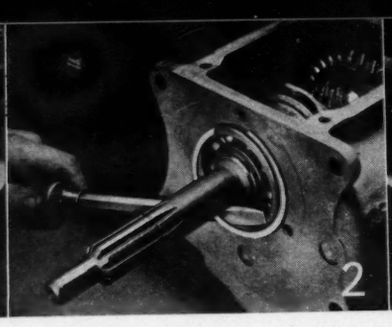
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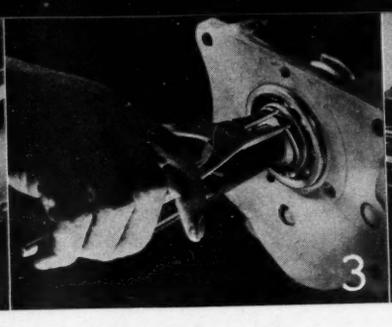
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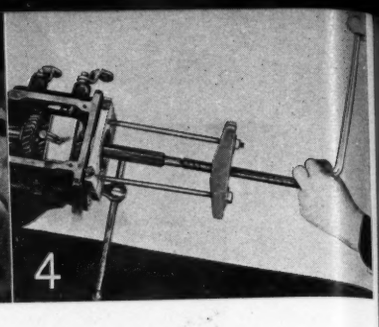
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STUDEBAKER Transmission OVERHAUL

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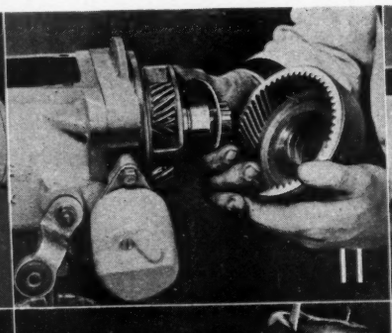
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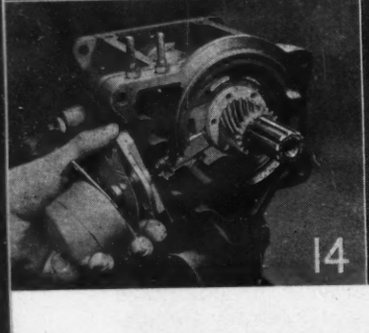
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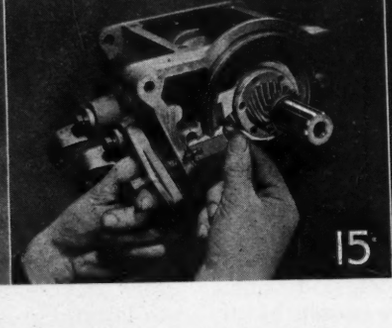
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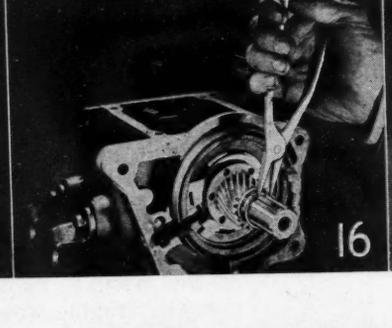
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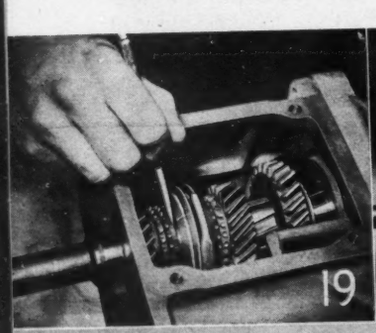
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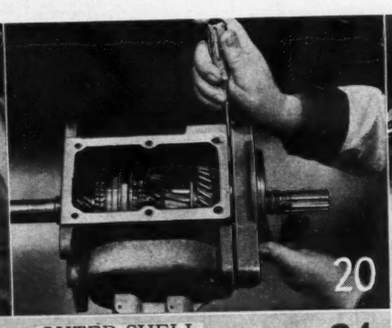
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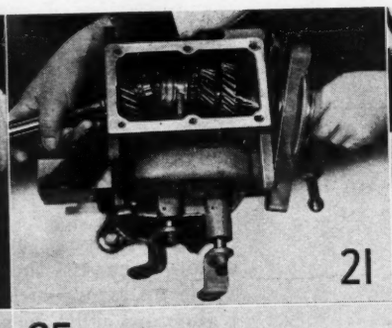
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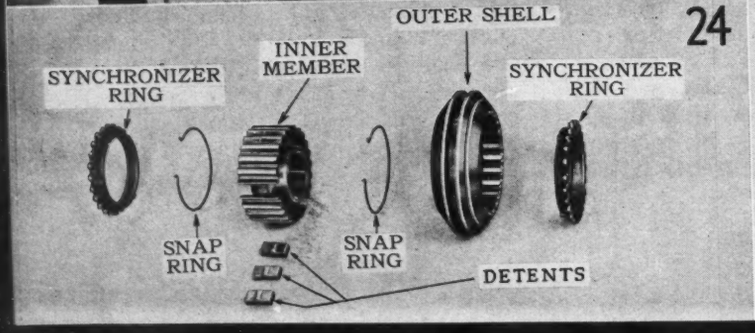

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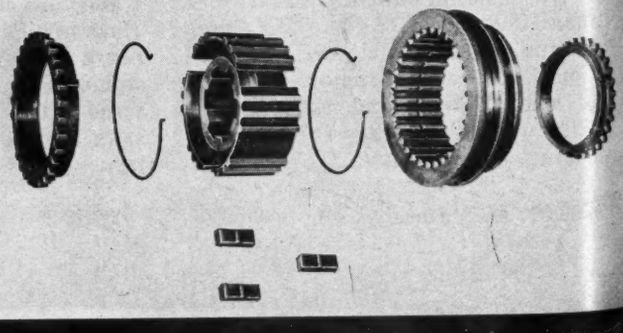
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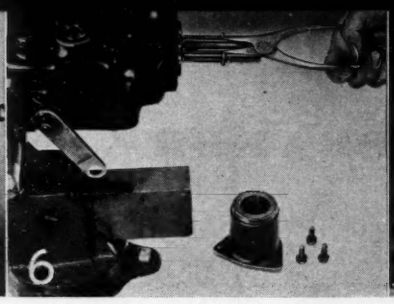
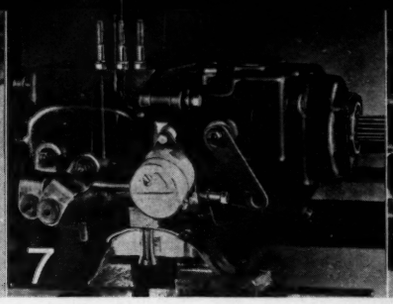
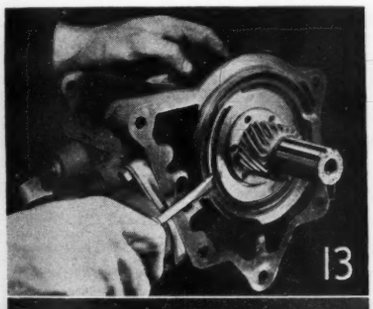
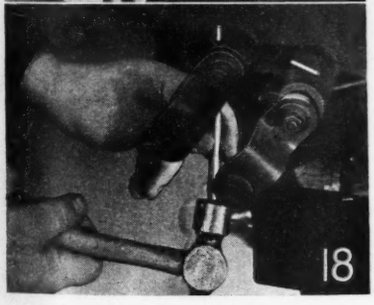


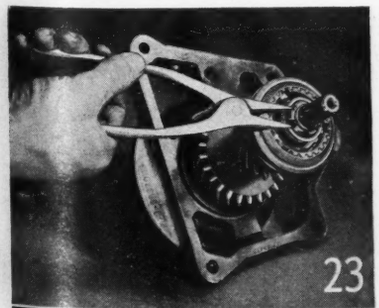


Here's another step-by-step picture story giving the complete service procedure on the 1941 Studebaker transmission

By ***BILL TOBOLDT***







1

Remove stamped transmission cover and the front flange.

2

Remove pinion bearing large snap ring.

3

Remove pinion bearing small snap ring with special pliers.

4

Remove pinion bearing by means of special puller.

5

When installing pinion bearing, use a section of pipe against the inner bearing race.

6

Remove overdrive case flange and remove overdrive rear snap ring by means of special pliers.

7

Remove the speedometer pinion and five cap screws which retain the overdrive housing to the transmission main case.

8

Remove the overdrive housing. It may be necessary to line up the free-wheeling shifter case with the finger in order to release it and remove the housing. Tap the end of the shaft lightly with a hammer if necessary to prevent the shaft from coming off with the housing.

9

Pull the overdrive rear shaft to the rear, taking care to catch the free-wheeling rollers as they fall out.

10

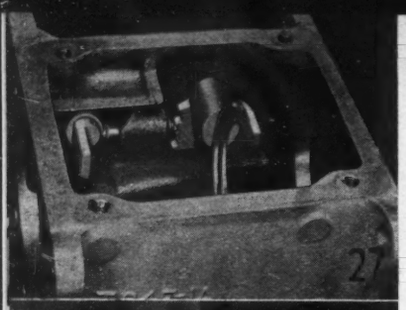
After removing the cap screw and lock washers, the free wheeling cam and hub bushing can be removed. When reinstalling the hub bushing, the tongue of the special washer must be installed toward the cam.

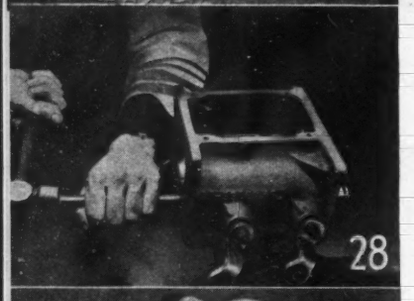
11

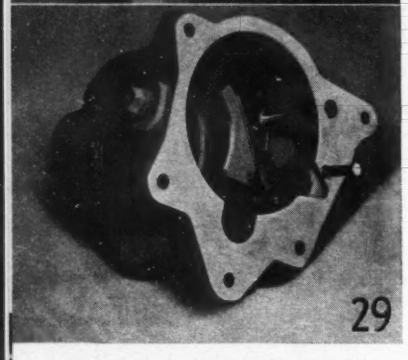
Remove the overdrive clutch and gear assembly and the bronze pinion cage thrust washer. If it is desired to remove the overdrive clutch from the ring gear, remove the snap ring and paint a mark on the ring gear and clutch to permit reassembly in the same position.

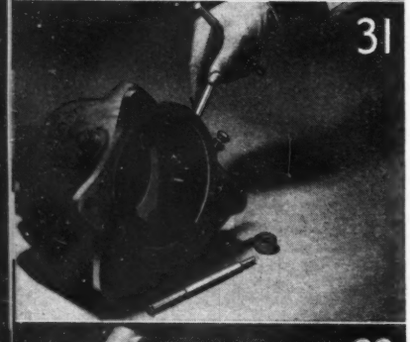
12

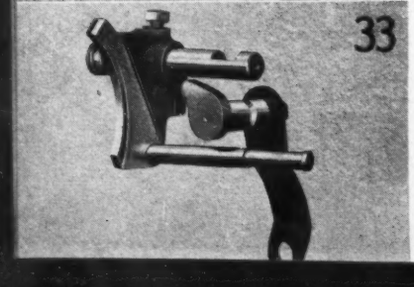
The overdrive pinion assembly can be removed by pulling it toward the rear.











STUDEBAKER Transmission OVERHAUL

13

Remove adapter snap ring and thrust plate.

14

Remove the solenoid which is attached with two machine screws.

15

Remove solenoid pawl and plunger.

16

Remove main shaft rear snap ring using special pliers.

17

Remove sun gear and blocker assembly.

18

Remove the shift shaft lock pins, using a small drift. Then pull the shift shafts out of the transmission case as far as possible.

19

Mark the relation of the synchronizer ring and synchronizer outer shell before removing any transmission gears. Marks must be realined before assembly.

20

Pry off adapter plate, using a small screw driver.

21

To remove the pinion, cock the angle of the pinion and main shaft, raise the pinion over the countershaft and pull it out through the front of the transmission case.

22

Pull the main shaft over as far as it will go to disengage the shift forks. Then, work the main shaft and gear assembly out through the rear of the transmission case.

23

After removing the main shaft snap ring, the synchronizer and main shaft gear can be slid off the main shaft.

24

Details of the synchronizer used on Champion models.

25

Details of the Commander and President synchronizer.

26

To remove the main shaft from the adapter plate it is necessary to remove the large lock ring.

27

Showing correct location of the shifter forks.

28

Take out countershaft lock and drive the Champion countershaft toward the rear. When removing countershaft on Commander and President transmissions use a dummy shaft to keep the roller bearings in place. When reinstalling the Champion countershaft, place the plain washer at the front end and the tongued washer at the rear with the tongue rearward. A ring washer is placed at each end of Commander and President countershaft bore and a tongued washer next to the case at both ends with the tongue toward the case.

29

The free-wheeling and overdrive shifter mechanism as it appears when assembled in the case.

30

After loosening the lock screw and removing the overdrive shift control lever, the overdrive shift lever and shaft can be removed.

31

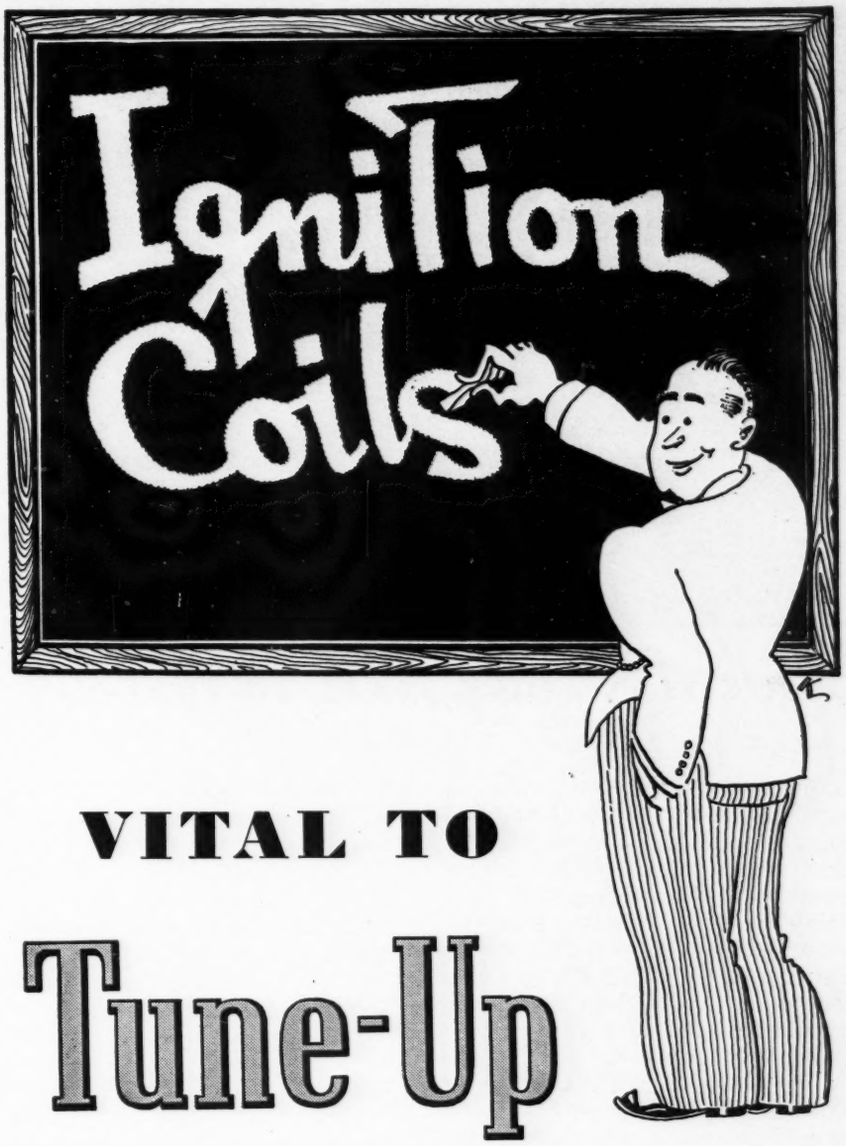
To remove the overdrive shift yoke, back out the lock screws, remove the plug and loosen the retaining screw.

32

Then remove the shift shaft fork and spring.

33

Overdrive shifter mechanism as it is assembled in the case.



VITAL TO Tune-Up

Here's Sam Miller, practical serviceman, with a practical discussion on what takes place inside the ignition coil

By JACK BEATER

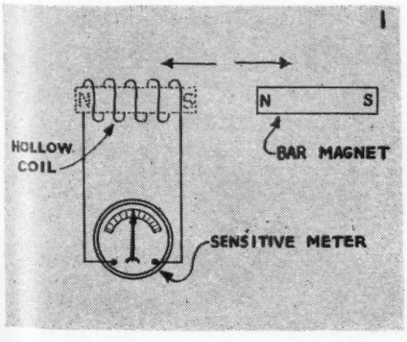
SAM MILLER felt a bit of pride as he turned the corner of the main street and saw the glow of his new neon sign. SAM MILLER, INC., it said, Automotive Electrical Specialists, and the warm rays highlighted the front of his streamlined service station building. As Joe dug in his pocket for the keys he thought back to 35 years before when he had started in the business of repairing "chug wagons" at 10 cents an hour. In those days a fellow had to learn the game the hard way, or he didn't learn at all. There were no books, no schools, no lectures, you had to squirm in grease and sweat and dig things up for yourself.

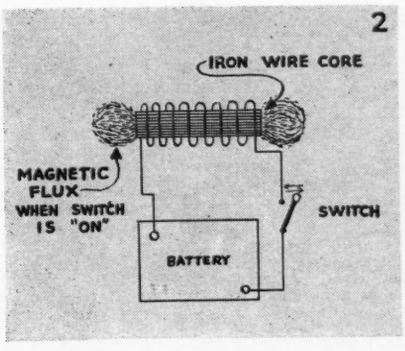
Sam switched on the lights in the Tune-Up corner of the shop and started to draw a few diagrams on the big blackboard he had installed on the wall. As he drew the shop force drifted in one by one. Attendance at these twice a month skull practice sessions was not compulsory, but Sam had a good memory for who came and who did not when it was time to make out the yearly bonus checks. Or to give a voluntary raise in pay.

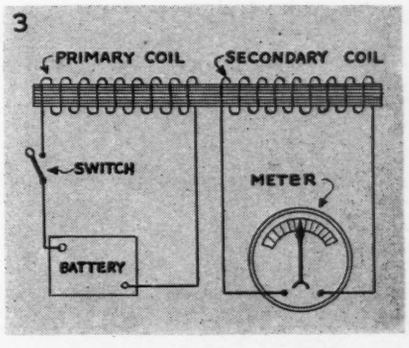
At last Sam turned from the blackboard and counted faces. He saw Les Jordan, his assistant and parts man, Harry Wilkins, Archie Roe, Red Roberts, Ken Stall and Sparks, 22-year-old radio ham, who was just starting to learn a business.

"Tonight I'm going to give you a little talk on ignition coils," Joe began, "because the coil is one of the most important things on a motor, and it is a sure-fire bet that a motor can't perform any better than the coil allows. There are all kinds of coils on the market and

(*Continued on page* 22)







IGNITION COILS VITAL TO TUNE-UP

in use. There are cheap coils and expensive coils, good coils and bad coils, and coils that are 100 per cent okay on one kind of motor and no good on a different motor. I'm going to tell you what I've learned about this coil proposition, so you can do a better job of selling a new coil when it's neded, and know how to fit a coil to a given engine and the driver's needs.

"I've always found that I can do a job better and quicker if I know in my head exactly what takes place when this or that happens, or when this or that doesn't take place. Even if the knowledge isn't necessary to the particular job you're doing at the moment it is a whale of a big help to know that you do know about all there is to know on that particular thing because it gives you confidence in yourself, self assurance, or whatever you want to call it. I think some of you younger fellows call it being 'hot.'"

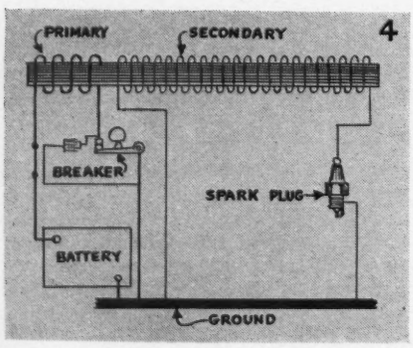
"Ken, here, maybe isn't all the way up on ignition coils," Archie Roe interrupted, "but he's plenty hot on this jitterburg stuff."

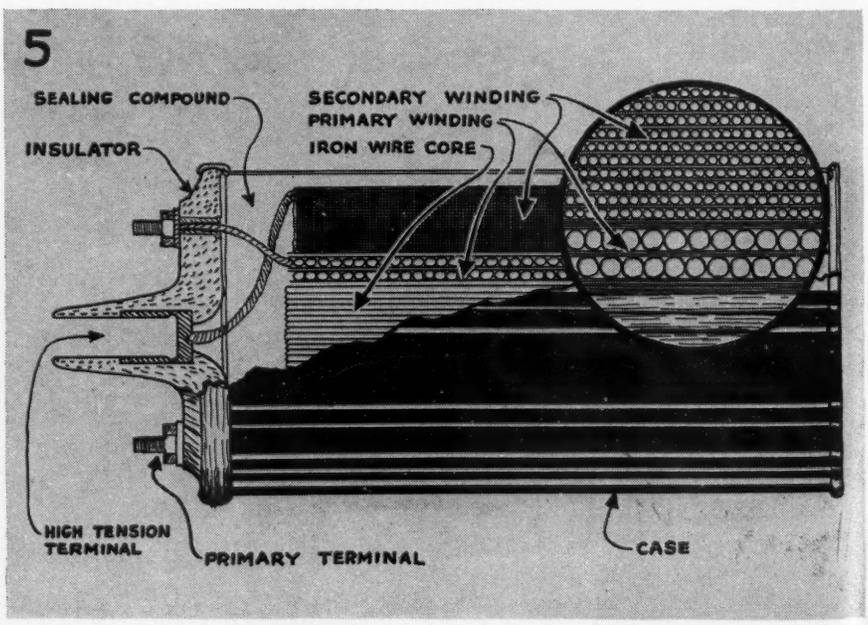
"Is that what's been jarring his brains loose lately?" Sam asked innocently. Everybody, including Ken, laughed. They knew he and the office girl, Miss Phyllis Phits, had just won a contest of some kind.

"To get the low-down on how a coil works," Sam continued, "we will do a little experimenting on the blackboard. In a college laboratory they would have the actual stuff to prove these things, but you can take my word for it that what I'm going to explain really will happen if you try it yourself. First we'll start with a plain coil of wire wound on a hollow paper tube. (See Fig. 1.) To the ends of this coil we'll connect a very sensitive meter, called a galvinometer. The meter gives no reading because there isn't any current in the circuit. Now we take a plain bar magnet and push it in and out of the coil, and right away we see the needle flicker every time the magnet goes in or out of the coil. That proves that current is being generated in the coil of wire as the magnetic field changes inside the coil. This is a first principle but it wouldn't be a practical way to make current for an ignition spark so we will have to do some more experimenting.

"Here in this second sketch (See Fig. 2) we have the same coil of wire, but instead of the magnet we have a bundle of iron wires that is placed inside the coil and left there all the time. The iron wire core is not inherently magnetic, and nothing happens until we connect the ends of the coil of wire to a battery and allow current to flow. At once the iron core becomes a strong magnet and sends out a magnetic flux—or field—from each end. As soon as the battery current is cut off this flux ceases, or as we say, it collapses. In a simple system like this a small but hot spark is produced at the point where the current line is broken, and years ago, before they had jump spark

(*Continued on page* 90)





"I still think it's the carburetor!"

FLAT RATING

Wheel Alinement

ON THE NASH MODEL 4140

This type of construction permits easy and accurate adjustment of the points of front wheel alinement

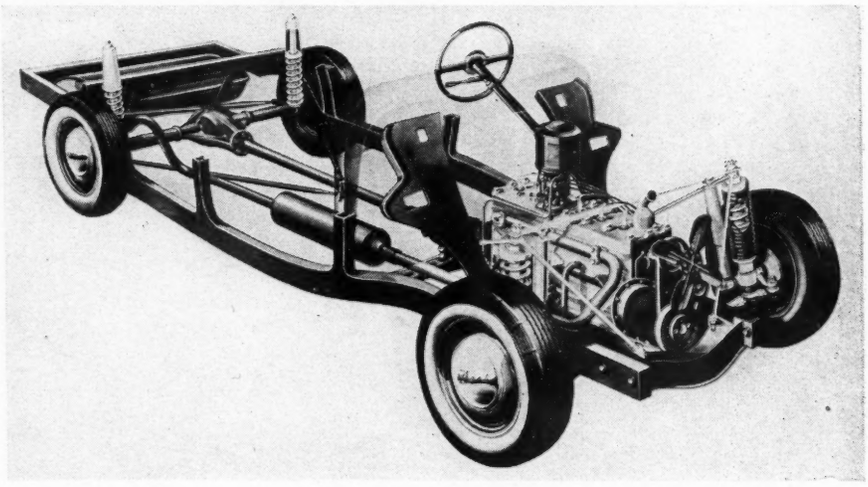
THE Lancia type of front wheel suspension used on the 1941 Nash Model 4140 presents an entirely different problem of wheel alinement as compared to the parallel link type of suspension.

The construction of this type of suspension is shown in detail in Fig. 1. The 20-in. king bolt is held stationary between the front axle channel on the bottom and the transverse bar at the top. The steering knuckle is attached to a sleeve which fits over the king bolt and slides up and down on rollers held by a retainer between the sleeve and the king bolt. The coil spring is held in place between a seat fastened to the sleeve and a seat fastened to the top of the king bolt.

As the front wheel rises to go over a bump, the steering knuckle and sleeve ride up on the king bolt against the tension of the coil spring. An airplane type shock absorber connects between the steering knuckle and the transverse bar to cushion the shock and control the rate of movement of the wheel.

At the upper end of the king bolt, where it is attached to the transverse bar, are two brace rods connecting the end of the king bolt with the frame, as shown in Fig. 2. These brace rods provide the means of adjusting caster and camber, as well as forming a support to hold the top of the king bolt steady.

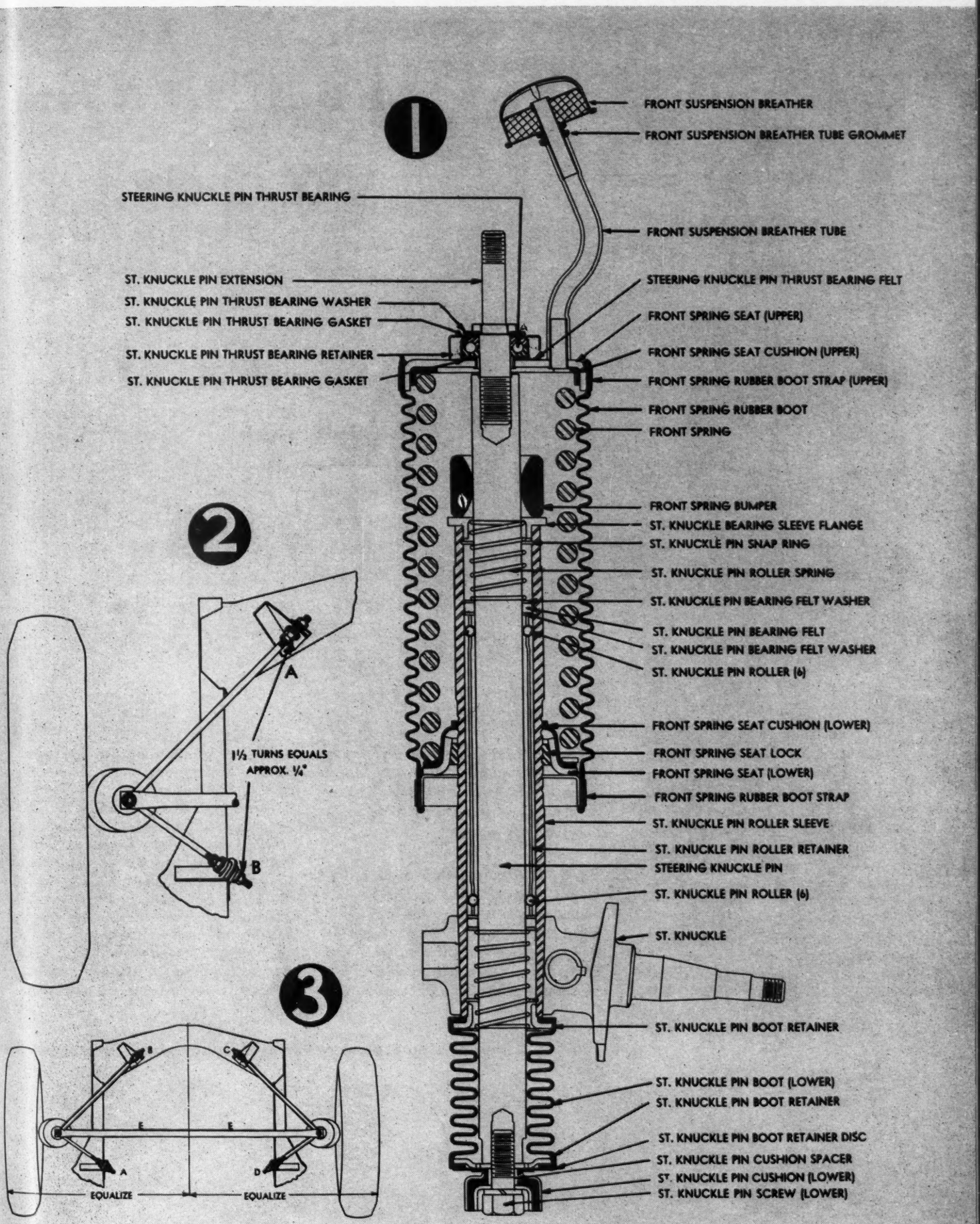
Caster is the backward tilt of the king pin at the top, so if you lengthen the long brace rod and shorten the short brace rod, the king bolt will be drawn backward at the top. This is exactly how caster is adjusted on this model. The correct caster angle is 0 deg., plus or minus ¼ deg. Naturally, the brace rod to be lengthened has to be loosened first, before the other can be tightened. Adjustments are made at points "A" and "B," shown in Fig. 2.



The Nash Ambassador "600", Model 4140, showing coil spring suspension

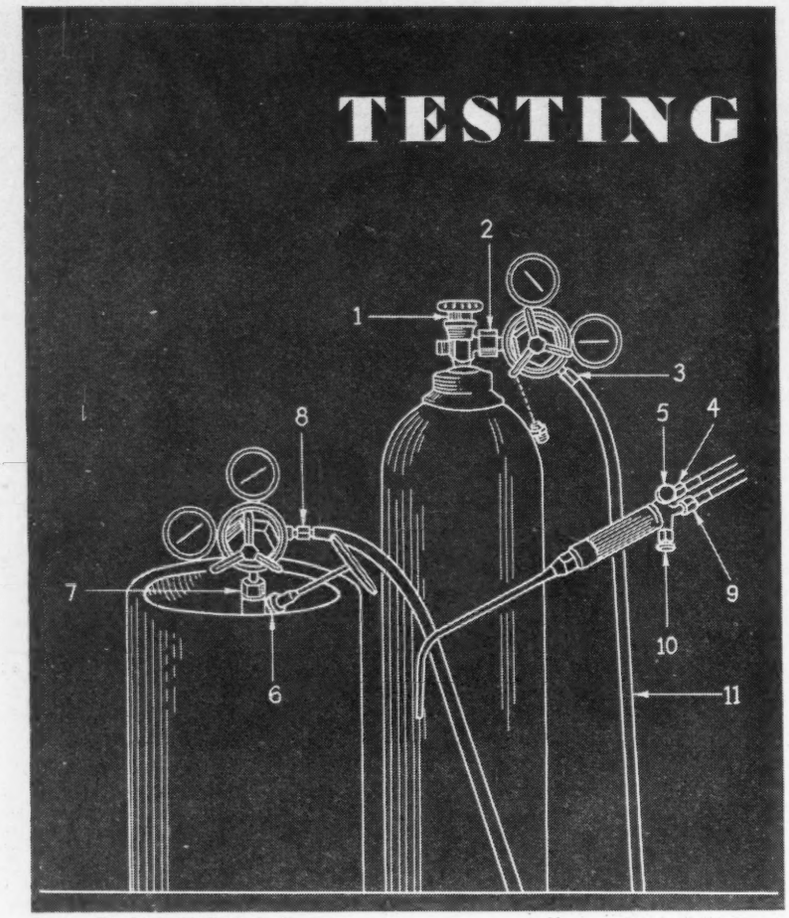
Camber is the outward tilt of the wheel at the top, so if the brace rods are both lengthened or shortened an equal amount, the king pin will be drawn farther away from or closer to the car at the top, effecting changes in camber. There is one point that has to be watched, however, and that is that a change in camber of one wheel affects the camber of the other wheel in the opposite direction. In other words, the transverse bar "E" shown in Fig. 3 extending over the top of the engine cannot be shortened or lengthened. Therefore, when an adjustment is made to reduce camber on the left wheel, for example, the transverse rod will be drawn toward the right side of the car as the brace rods on the left side are shortened, and this will result in increasing the camber on the

(*Continued on page* 86)


1
FRONT SUSPENSION BREATHER
FRONT SUSPENSION BREATHER TUBE GROMMET
STEERING KNUCKLE PIN THRUST BEARING
FRONT SUSPENSION BREATHER TUBE
ST. KNUCKLE PIN EXTENSION
ST. KNUCKLE PIN THRUST BEARING WASHER
ST. KNUCKLE PIN THRUST BEARING GASKET
ST. KNUCKLE PIN THRUST BEARING RETAINER
ST. KNUCKLE PIN THRUST BEARING GASKET
STEERING KNUCKLE PIN THRUST BEARING FELT
FRONT SPRING SEAT (UPPER)
FRONT SPRING SEAT CUSHION (UPPER)
FRONT SPRING RUBBER BOOT STRAP (UPPER)
FRONT SPRING RUBBER BOOT
FRONT SPRING
2
A
1½ TURNS EQUALS APPROX. ¼"
B
FRONT SPRING BUMPER
ST. KNUCKLE BEARING SLEEVE FLANGE
ST. KNUCKLE PIN SNAP RING
ST. KNUCKLE PIN ROLLER SPRING
ST. KNUCKLE PIN BEARING FELT WASHER
ST. KNUCKLE PIN BEARING FELT
ST. KNUCKLE PIN BEARING FELT WASHER
ST. KNUCKLE PIN ROLLER (6)
FRONT SPRING SEAT CUSHION (LOWER)
FRONT SPRING SEAT LOCK
FRONT SPRING SEAT (LOWER)
FRONT SPRING RUBBER BOOT STRAP
ST. KNUCKLE PIN ROLLER SLEEVE
ST. KNUCKLE PIN ROLLER RETAINER
STEERING KNUCKLE PIN
ST. KNUCKLE PIN ROLLER (6)
ST. KNUCKLE
3
B
C
E
E
A
D
EQUALIZE
EQUALIZE
ST. KNUCKLE PIN BOOT RETAINER
ST. KNUCKLE PIN BOOT (LOWER)
ST. KNUCKLE PIN BOOT RETAINER
ST. KNUCKLE PIN BOOT RETAINER DISC
ST. KNUCKLE PIN CUSHION SPACER
ST. KNUCKLE PIN CUSHION (LOWER)
ST. KNUCKLE PIN SCREW (LOWER)

TESTING FOR LEAKS

Welding



Courtesy The Linde Air Products Company

1. Oxygen Cylinder Valve Stem. First close the blowpipe oxygen valve and adjust oxygen regulator to 20 to 30 lbs. per sq. in. pressure. Then test oxygen cylinder valve stem with soapy water. If cylinder leaks, notify your supplier, giving the serial number stamped on the cylinder.

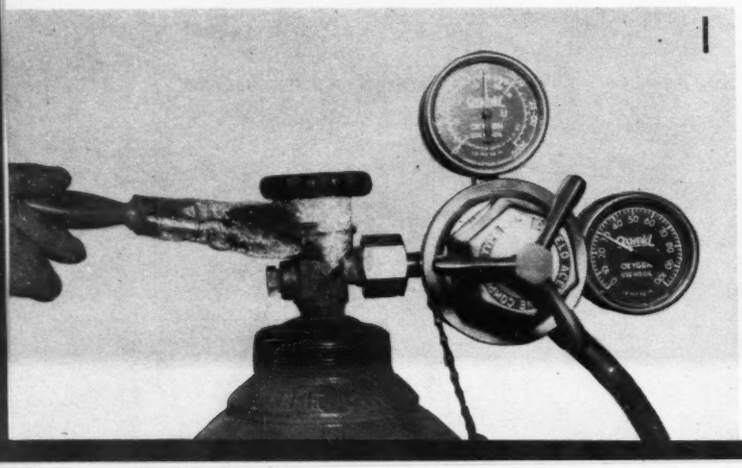
2. Oxygen Regulator Inlet Connection. Next test the connection between regulator and cylinder. If the connection leaks, close cylinder valve, open blowpipe oxygen valve, take off regulator, clean cylinder valve seat and regulator inlet nipple seat, replace regulator and retest. If leak continues, return regulator to the manufacturer for repair.

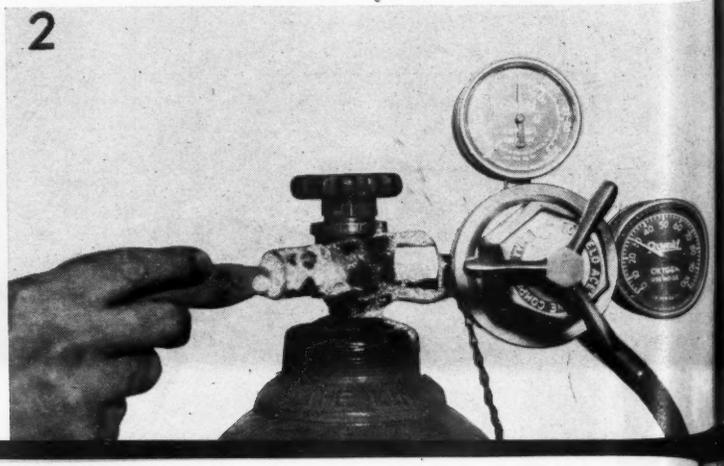
3. & 4. Oxygen Hose Connections. Test all hose connections including those at regulator and blowpipe. If they leak, tighten them. If leak continues, cut off 2 in. from end of hose and reconnect hose to nipple of correct size. If the connection still leaks, check entire hose for leaks and replace if necessary.

5. Blowpipe Oxygen Valve. Should the blowpipe valve leak around the valve stem, tighten the packing nut, but not too tight for easy operation of the valve. If the leak continues, repack the valve, but use only packing supplied or recommended by the manufacturer of the blowpipe.

6. Acetylene Cylinder Valve Stem. Close blowpipe acetylene

A step by step procedure for using soapy water to test for leaks





IN YOUR

Equipment

Loose connections are responsible for more fires than any other single cause. In addition, they are wasteful of the contents of the cylinder. It pays in terms of safety, efficiency and economy to make these tests regularly.

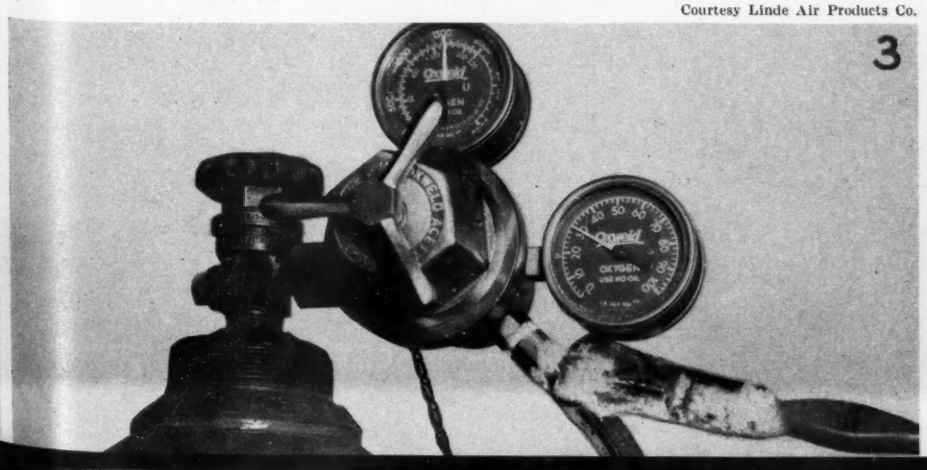
valve and adjust pressure to 10 lb. per sq. in. Test cylinder valve stem. If there is a leak, close cylinder valve, open blowpipe valve, and release regulator pressure. Tighten cylinder gland nut, and retest. If leak continues, tag cylinder as unserviceable, place outdoors, and notify your supplier.

7. Acetylene Regulator Inlet Connections, Hose Connections, and Blowpipe Acetylene Valve. (Refer also to points 8, 9 and 10 in the large diagram.) If leaks are discovered at any of these connections, follow the instructions as given under paragraphs 2, 3, 4 and 5.

8. Hose Examine hose carefully at least once a week for leaks, worn places and loose connections. This is done by immersing the hose under normal working pressure in water. Leaks should be repaired by cutting off the damaged section and inserting a hose coupling as a splice.

at the valves and hose connections

Courtesy Linde Air Products Co.



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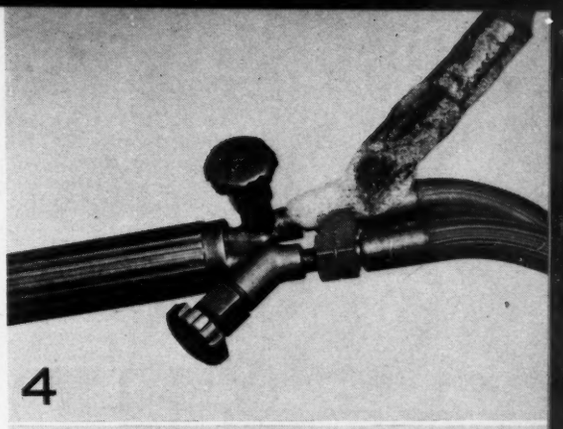

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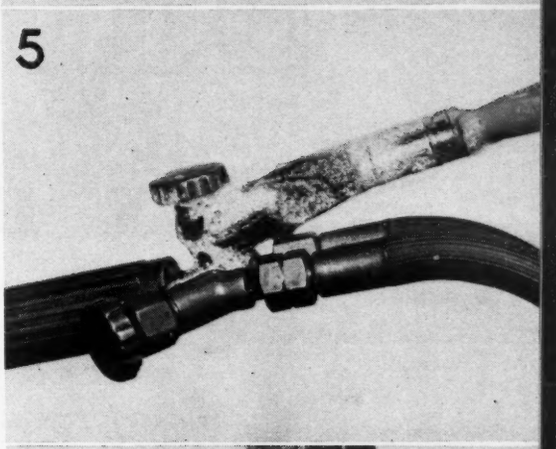

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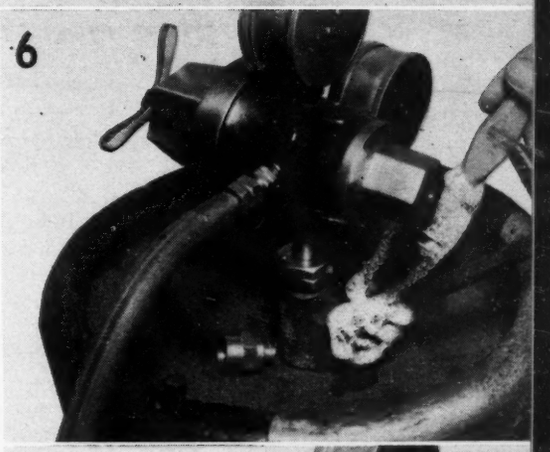

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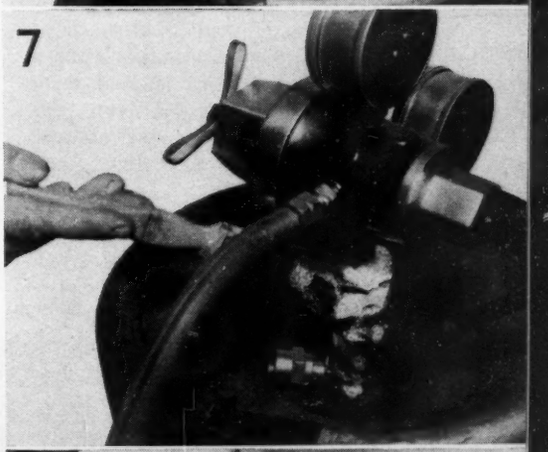

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8

Super Service

IN EUREKA, ILL.

Small town dealer uses super service method to give customers' cars complete service from gas and oil to major overhauling

SINCE moving from a down-town location, where he operated a garage with a new car sales department, into his new complete super-service station on the outskirts of Eureka, Ill., B. E. Heyl, proprietor of Heyl Motor Co., has nearly doubled his service business.

Eureka is a town of 2000 population, known as the pumpkin center of the United States. Heyl, after several years' experience as a garage mechanic, opened a garage and car agency sixteen years ago. His business grew steadily. He more and more realized, however, that if he had gas, oil and lubrication service, together with better facilities for quick and emergency services, he could easily increase his business. At his old location he had no opportunity of expansion. Therefore he built the new station and added the other services.

"Our idea," says Heyl, "was to have enough room to properly take care of business which had grown too large for the facilities we had; to furnish a complete service so that customers could have all kinds of automotive work done at one place and at one time if desired, therefore always thinking of us when needing any kind of automotive service; and, by furnishing this complete service, to secure more repair work so the latter would take care of more of our fixed overhead. Our idea has worked out wonderfully. In our down-town location, the garage paid 46 per cent of our fixed overhead. In our new station, it is paying 87 per cent, leaving only 13 per cent of fixed overhead to be paid from the profits of our other departments."

Here's how the super service method is applied to boost service for a small-town operator. 1. Note the smart building exterior and the gasoline pumps. 2. Gas pumps through the show room window. Super service provides leads for new and used car sales. 3. B. E. Heyl selling a heater to a customer who is having his car greased. 4. Fender repair with a power hammer. 5. Tachometer operation to aid in adjusting the Olds Hydra-matic drive. 6. Front wheel greasing. 7. Valve grinding and major overhauling is an important

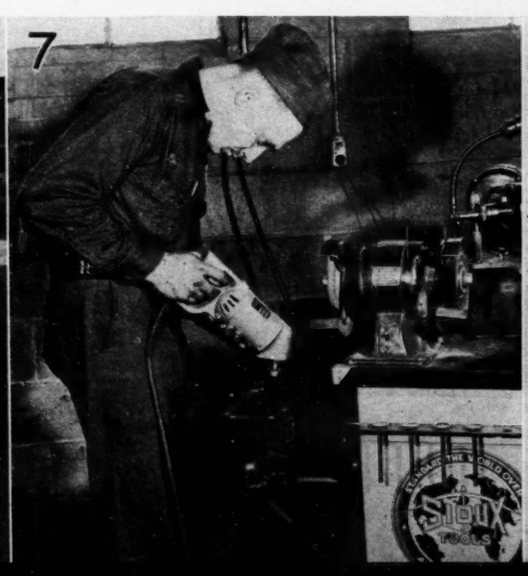
By HARRY L. SPOONER

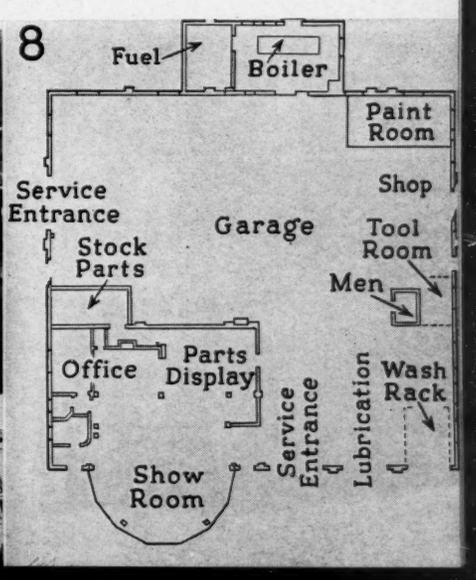
The new building has a frontage on the street of 240 feet and a depth of 287 feet. It is a mill-constructed building of concrete blocks, with the front of enameled tile. "With plenty of parking space for customers, and with plenty of room inside, we also get rid of the loafers always hanging around a down-town store, and can talk with customers and render service to them without being crowded," says Heyl.

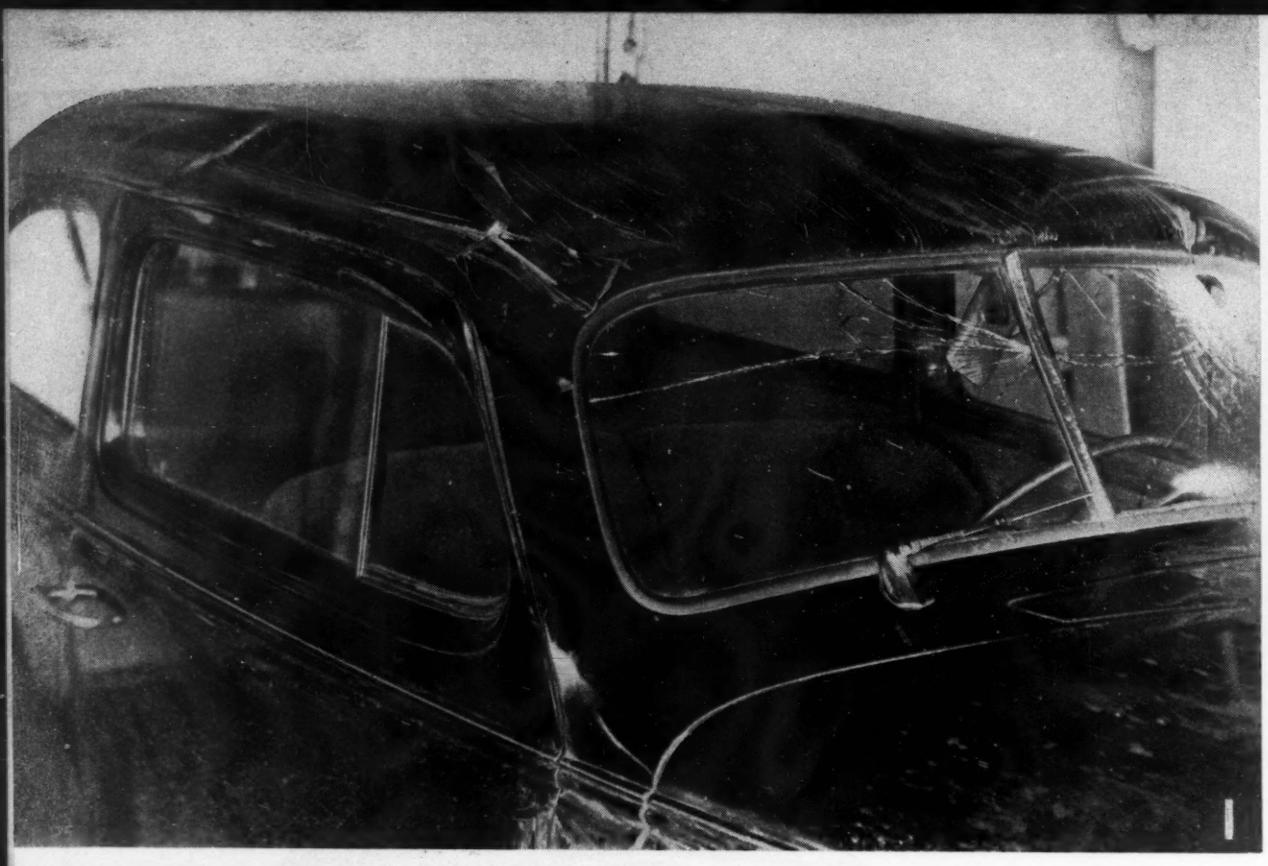
A small building back of the main building houses 16 used cars

(*Continued on page* 78)

part of this super service set-up. 8. Floor plan for super service. Note the accessibility of the service department from either front or side of the building.



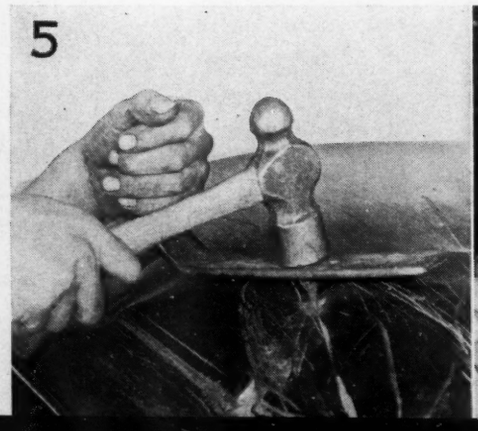


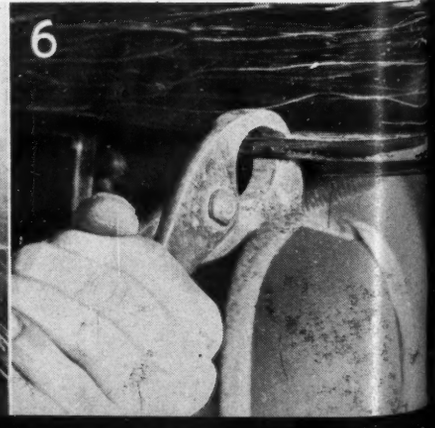


Turret

Eleven steps in the

top to it's original





Top REPAIRS

process of restoring a damaged turret condition, efficiently and permanently

By CLARENCE C. HURLEY

A LARGE number of jobs requiring body repairs necessitate some degree of turret top work. Body mechanics must have a thorough understanding of the work and adequate tool equipment necessary to return the damaged unit to its original condition in the quickest way, and yet effect a permanent repair.

In order to explain the science of turret top repair, the damaged car shown in Fig. 1 will be used.

The frame should be checked for proper alinement, since it is the foundation of all body construction. No successful repairs can be made until the frame is in perfect alinement.

To facilitate repairs and prevent damage on the car shown, the door, front seat assembly, rear seat cushion and headlining should be removed, as well as the windshield glasses.

Before attempting any actual repairs, the door openings, front section, center section must be checked individually and in relation to each other. The adjustable tram in Fig. 2 and a scale are the tools used for this portion of the repairs.

When an all-steel body is damaged, certain metal strains are set up, because metal is made up of a series of grains, the same as wood; and when these grains are stretched or compressed, they get out of their preformed alinement. The best way to relieve this misalinement or strain is through the use of heat, known as normalizing.

To retain the alinement of the right hinge pillar after it has been pushed out, the strains set up in the area should be relieved, as shown in Fig. 3, by heating the metal until it just starts to turn red.

Turret top repair is not as difficult as the appearance of the damage might indicate. A good job will result from studying the damage or depressions, and selecting the proper tools to work them out. The damage should always be taken out the same way it went in.

It will be found helpful to use a piece of one inch board between the ball and the top panel, as we see in Fig. 4. This is actually a roughing out operation.

During these roughing out operations, any sharp edges found around the depression being pushed up should be spring-hammered; this operation is shown in Fig. 5, and should be done with a surfacing spoon and hammer to relieve the strain. Spring-hammering on a metal panel prevents putting hammer marks on the metal, and because of this, saves considerable time during the process of finish-

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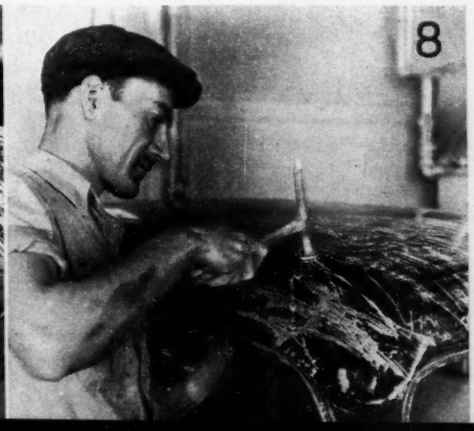
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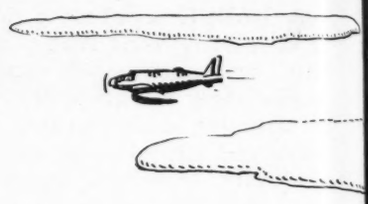
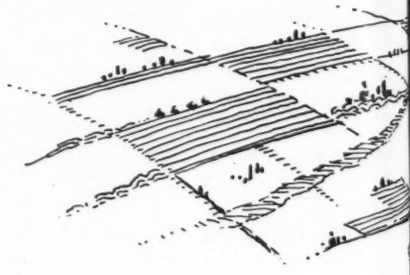
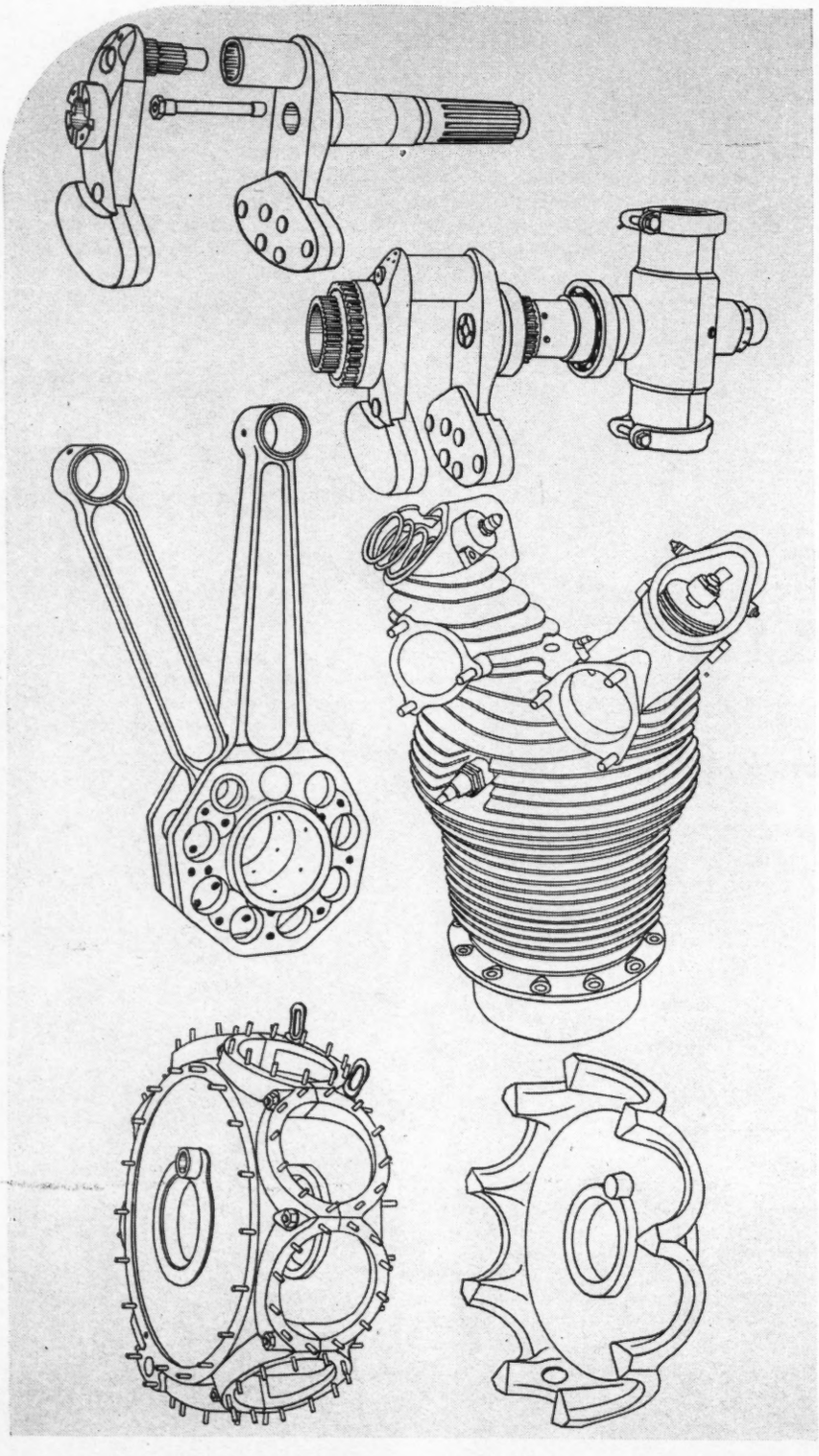
11

Servicing

RADIAL ENGINE





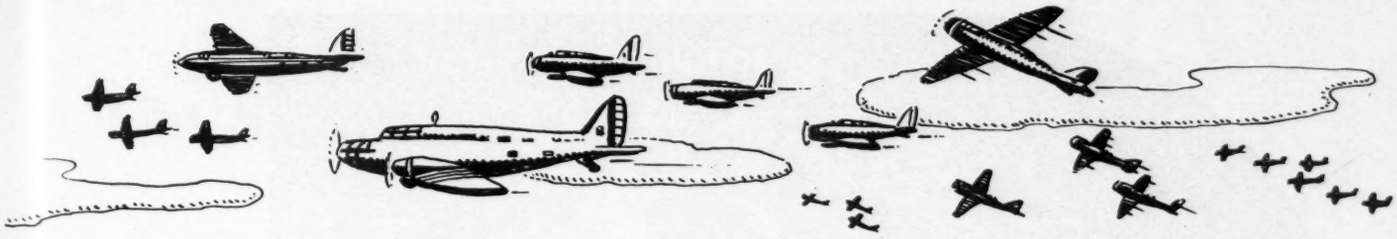


WE are living in a period in which National Defense is the principle topic of conversation. In its broader sense that term applies to the general defense of the Nation; in its more specific sense it comes down to each individual's part in the general scheme, and in many cases it means active participation in the armed forces of the country through the selective service training program.

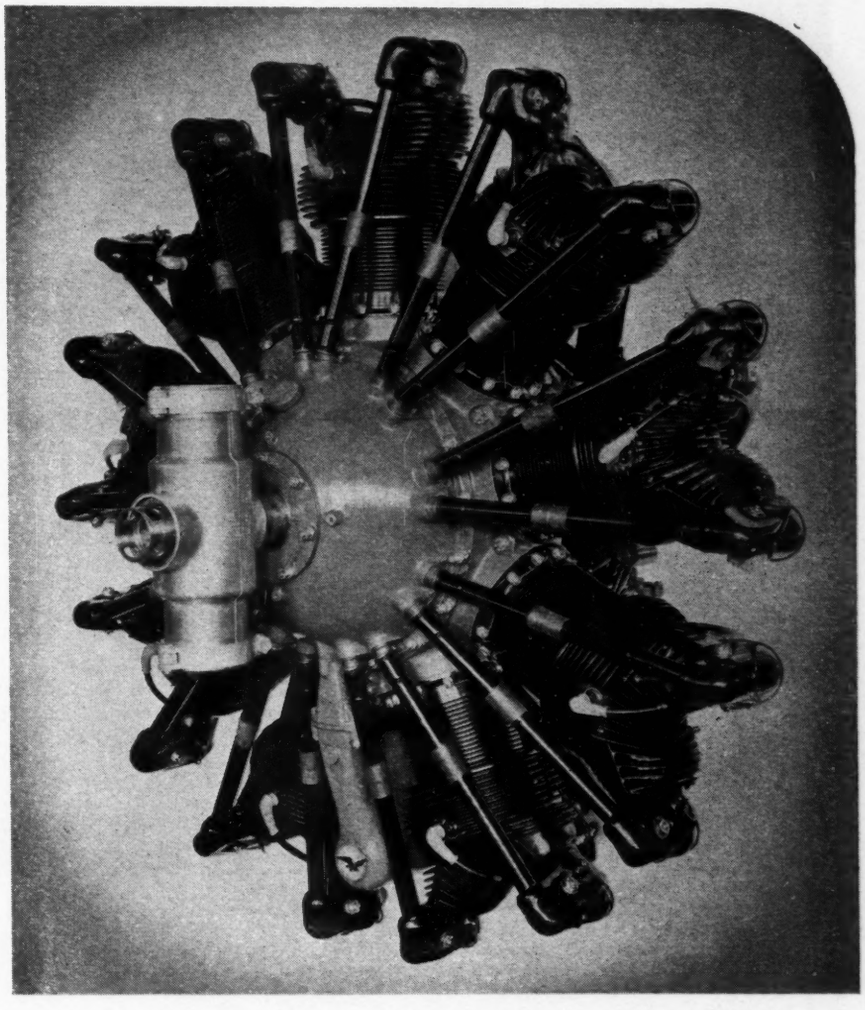
Every man called to active duty should try to get himself assigned to that branch of the service where his past experience will enable him to do the best job. To mechanics that means that they should try to get in the units having mechanized equipment, so that their mechanical knowledge can be used to the best advantage.

The average gasoline engine used in trucks will cause the mechanic no particular difficulty—it is the same unit he has been working with every day. But the radial engine is a horse of a different color, and since it is being used in tanks as well as in airplanes, a little information about its design and construction might be of interest to those fellows who may find themselves assigned to units using this equipment.

Top—The radial engine crankshaft disassembled, showing front and rear halves; and the crankshaft assembled, with the propeller hub. Center—The master connecting rod with one link-rod attached—seven more link-rods are required to complete the assembly for this 9-cylinder engine. Right—Single cylinder, showing bolt holes for attaching to crankcase.
Bottom—At the left the two center sections of the crankcase are assembled, and at the right is shown the front half only.



FOR NATIONAL DEFENSE



First of a series of service articles on the Nation's motorized equipment for military use

By BOB HANKINSON

The average layman finds it hard to distinguish between the radial engine and the rotary engine. Both types have the cylinders arranged to extend outward from the crankcase like the spokes of a wheel, and from outward appearances the two look somewhat alike when the engines are not running. However, there is a big difference in the operating characteristics of the radial and the rotary engine—the rotary engine has its crankshaft rigidly fastened to the engine mounting supports and the cylinders and the crankcase revolve around the crankshaft: the radial engine has the cylinders and crankcase rigidly fastened to the engine mounting supports and the crankshaft revolves inside the engine, just the same as the conventional passenger car or truck engine of the in-line type.

The rotary engine, popular during the last war, is now practically out of existence, so we are concerned entirely with the radial type. While there are quite a few makes of radial engines being made at this time, perhaps the ones which most readily come to mind are the Pratt & Whitney and the Wright engines used in airplanes. They are, of course, air-cooled.

Aside from the appearance, the outstanding point of difference between the radial engine and the automobile engine is that the radial is always made with an odd number of cylinders, usually 5, 7 or 9 cylinders. This is to permit all cylinders to fire at regular intervals. In other words, being of the 4-cycle principle, each cylinder fires

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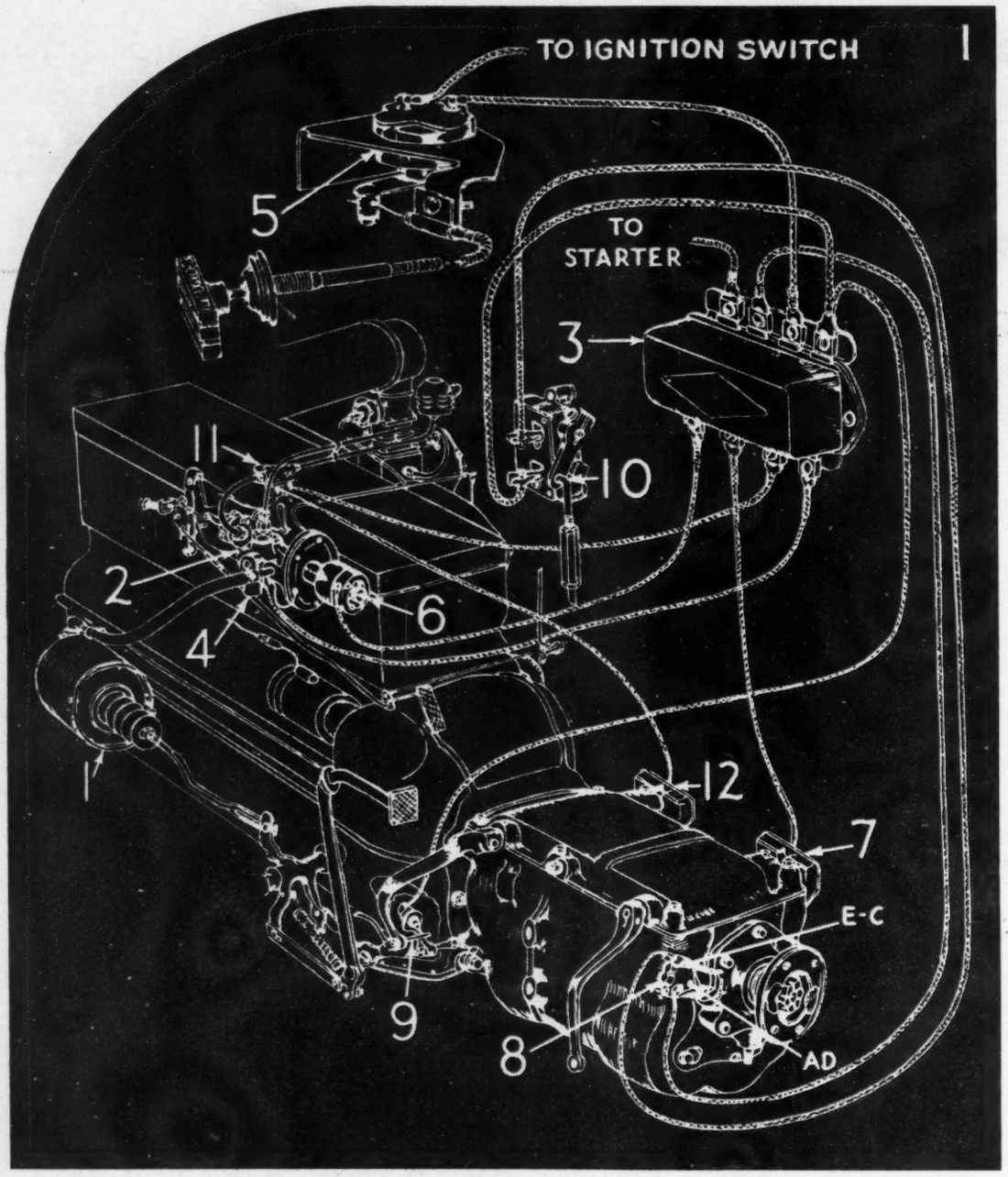


Left:

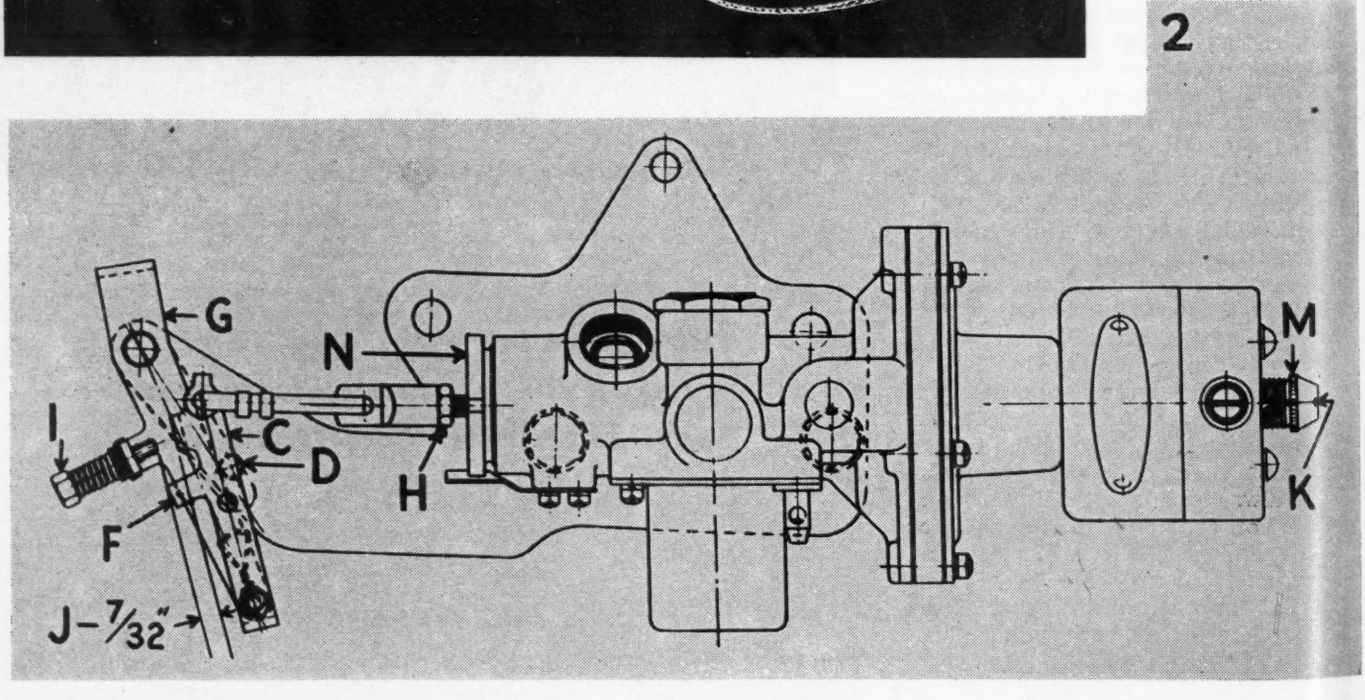
1. Power Cylinder
2. Clutch Contro Valve
3. Three-unit Relay
4. Direct Speed Solenoid
5. Lock-out Switch
6. Low and Reverse Solenoid
7. Low and Reverse Switch
8. Governor Switch
9. Direct Speed Switch
10. Accelerator Switch
11. Second Speed Solenoid Valve
12. Second Speed Switch

AD Connection to AD Terminal on Relay

EC Connection to EC Terminal on Relay

Below: details of the clutch control valve, showing points of adjustment.

Opposite page: wiring diagram, showing relay and solenoid switch connections.



ADJUSTING THE PACKARD ELECTROMATIC Clutch

An up-to-the-minute how-to-do-it story on the adjustment of Packard's new automatic clutch

THE Electromatic Clutch available as special equipment on the 1941 Packard cars combines the use of engine vacuum for operating the clutch release mechanism with solenoid switches to control the timing and rate of movement of the vacuum cylinder. A feature of this equipment is that it can be made inoperative at any time at the will of the driver simply by turning a switch located on the instrument panel. When it is off, the clutch is operated by the foot pedal in the conventional manner.

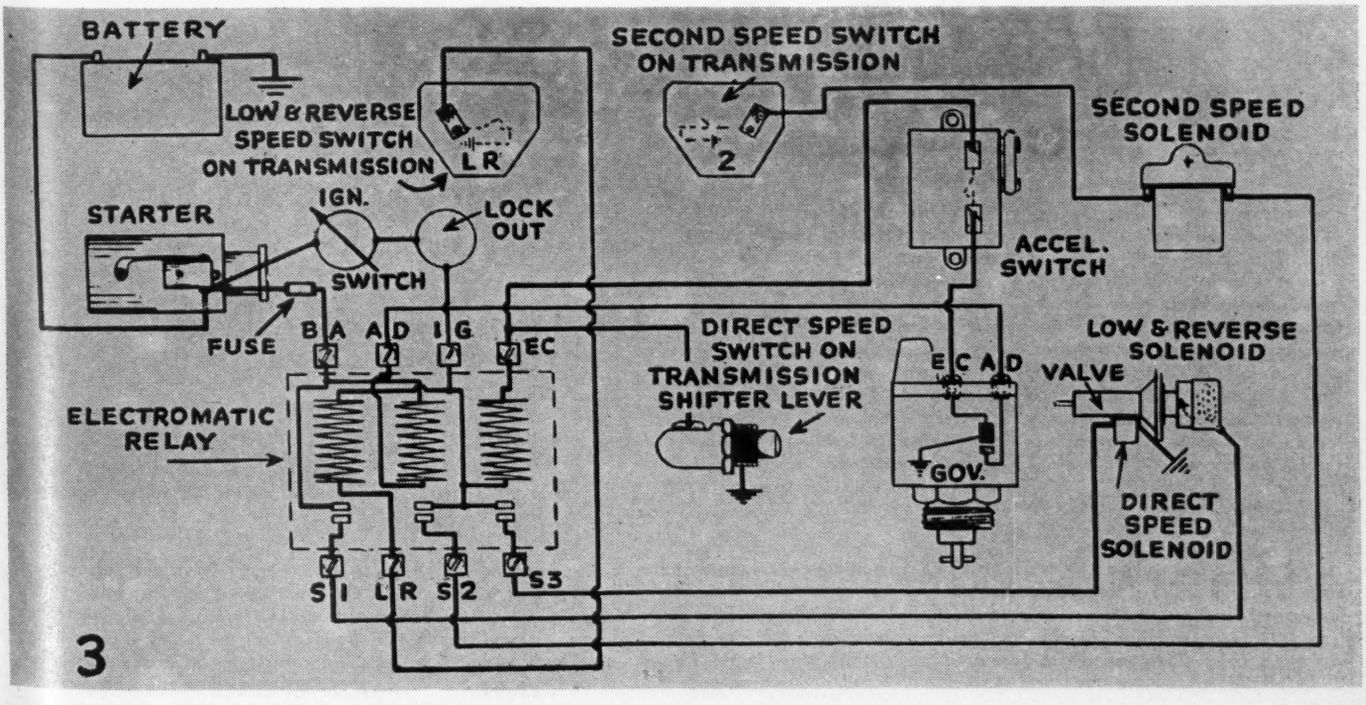
When attempting to service this unit, the first effort should be directed toward engine tune-up. Since the clutch is operated by engine vacuum, satisfactory operation cannot be expected unless the engine is tuned and adjusted for a smooth, even idle. All adjustments should be made while the engine is warm, and idling normally at a speed equivalent to 8 or 10 m.p.h. car speed.

1. The clutch pedal free play should be 2 in.

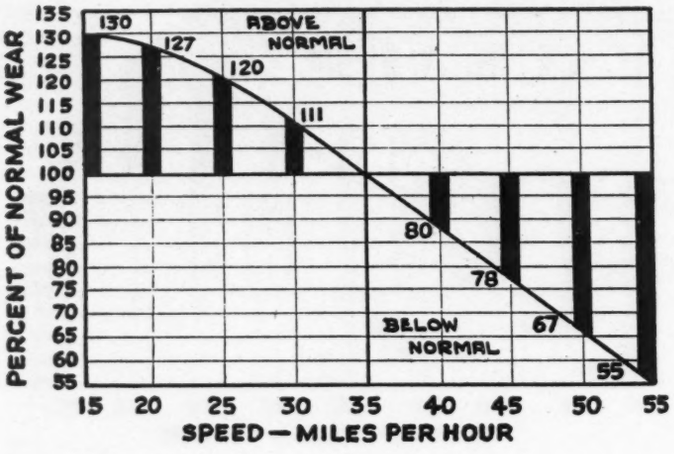
2. Accelerator and throttle linkage adjustment—set the carburetor cross shaft lever linkage so that with the throttle operating lever "G" (Fig. 2) in contact with stop pin "D," carburetor throttle lever rests on the idle adjusting screw and the linkage is free with normal slack. Adjust accelerator pedal lever at turnbuckle so that with the lug "F" on clutch control lever "C" holding throttle operating lever "G" against stop pin "D," there is 1/32 in. to 1/16 in. clearance at the accelerator cross shaft stop.

3. Engine speed adjusting screw gap—holding control valve lever stop "F" against throttle lever "G,"

(*Continued on page* 84)

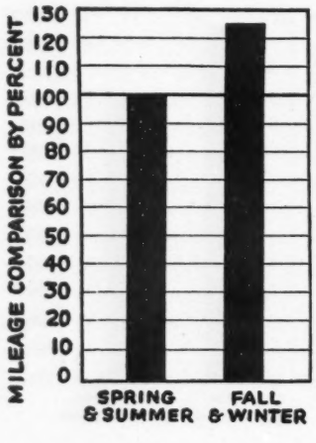


HIGHER SPEED MEANS FASTER TREAD WEAR



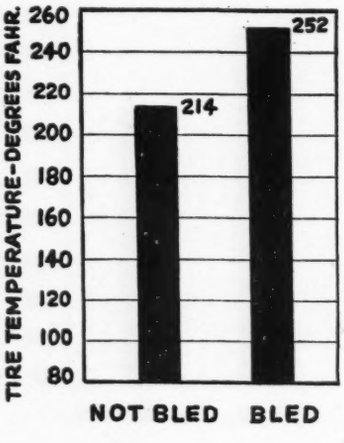
Excessive heat causes fast tread wear and induces blowouts. As the speed increases, the number of flexes of the tire per minute increases, and the more rapidly a tire flexes the greater the build-up of heat. As higher temperatures are reached the tread rubber becomes softer and the tensile strength of the cords in the cord body is reduced. Softer tread lowers its resistance to wear, and a decrease in tensile strength of the cord body lowers its resistance to road shock. The ultimate result is a decrease in tire mileage. The effect of high speed can be minimized by a reduction in payload.

EFFECT OF DATE OF APPLICATION



The season in which tires are applied effects the ultimate tire mileage. Tires applied in spring or summer when temperature is a factor, dissipate heat slower due to the new and heavier tread. Therefore, they run hotter, wear faster, and are more subject to blowouts. Tires applied in fall and winter, being more worn, have a thinner tread when hot weather comes, dissipate heat faster and therefore run cooler and longer.

EFFECT OF BLEEDING ON TEMPERATURE



Do not bleed tires for maximum tire mileage. Bleeding tires increases the amount of flexing. Greater flexing causes higher tire temperatures, and higher temperatures result in faster tread wear and increasing danger of heat blowouts. If tires are bled, inflation drops appreciably below recommended pressure upon cooling. The possible exception to the rule is when tires operate over rough roads which might cause bruising.

FACTORS

The chart on the left side of the opposite page shows the effect of inflation on tire performance. Underinflation results in fast, irregular tread wear due to the increased squirming and scuffing over the contact area. Underinflation causes excessive flexing which increases tire temperatures, in turn resulting in faster tread wear and subjecting tires to greater danger from heat blowouts. Overinflation promotes danger of bruising and cutting, since it puts both the cord body and tread under greater tension which increases the ease with which either cuts or bruises occur. Overinflation causes fast tread wear in the center of the tread, due to a decrease in the road contact area and the resulting increase in load per square inch. Watch inflation pressure for maximum tire life.

AFFECTING Tire LIFE

Load, inflation pressure, speed and temperature are important items in the life of a truck tire

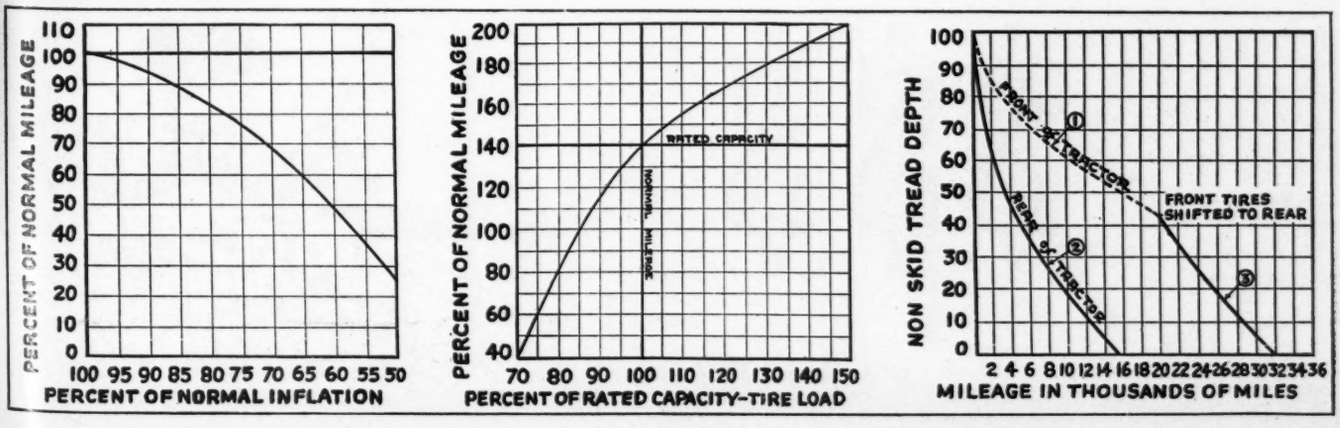
NO one in the industry watches tire costs more closely than truck and fleet operators. This is easy to understand when you consider the initial cost of a truck tire is considerably more than a passenger car tire, plus the fact that a heavy truck usually is equipped with dual wheels on the rear, and that the average fleet operator has several trucks on the road all the time. Therefore, he is more conscious of the cost of operating his trucks, and tire expense is one of the most important items of operating costs.

Proper attention to tire equipment and to the conditions under which the tires are operated offers an opportunity for the fleet operator to keep a close control over this item of expense. The charts on these pages are based on actual truck tire experience and tests. They are presented as reminders of the various factors influencing tire performance, and of the extent to which they affect tire life.

The chart below indicates the effect of load on tire performance. Overloading causes fast tread wear by increasing the load per square inch of contact area. It also increases the amount of tire flexing which in turn builds up excessive heat, finally resulting in a higher rate of tread wear, and in the danger of heat blowouts. The effects of overloading may be minimized to a certain extent by a reduction in speed. According to the chart, a 20 per cent overload will reduce the normal tire mileage by 30 per cent.

Below is a chart showing the effect of rotating tires. Since the rate of tread wear is definitely slower on front tires than on rear tires, it is recommended that the tires be changed from front to rear to obtain maximum tire mileage. In the case represented on the chart, the front tires were run 20,000 miles on front position (line 1) then changed to rear. Note the increase in rate of wear after the change (the slope of line 3 as compared to line 2.) As much as 50 per cent additional mileage can be obtained by rotation.

Courtesy The Goodyear Tire & Rubber Co.

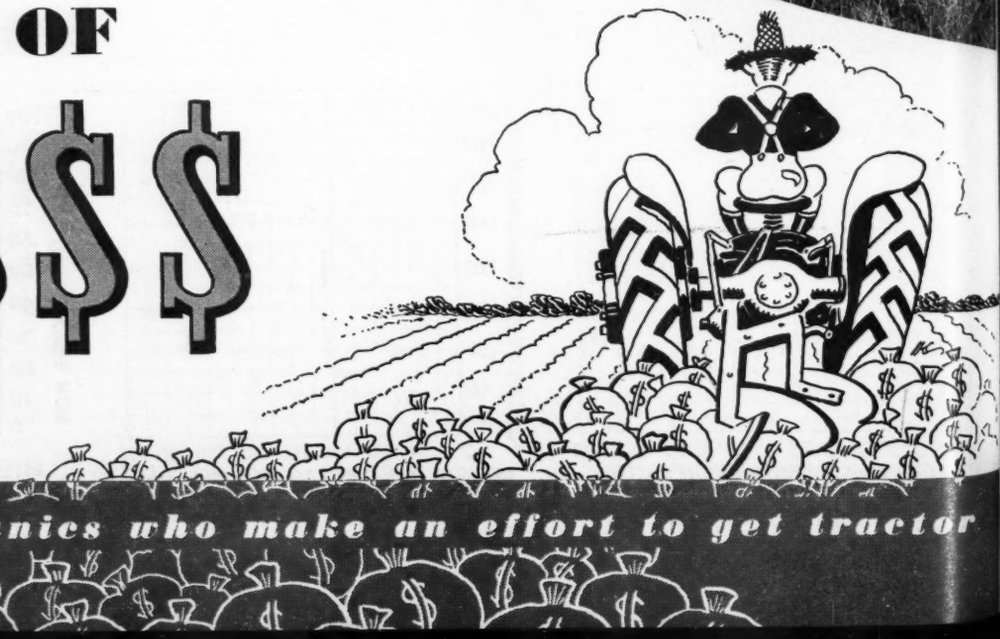

PERCENT OF NORMAL MILEAGE
110 100 90 80 70 60 50 40 30 20 10 0
100 95 90 85 80 75 70 65 60 55 50
PERCENT OF NORMAL INFLATION
PERCENT OF NORMAL MILEAGE
200 180 160 140 120 100 80 60 40
RATED CAPACITY
NORMAL MILEAGE
70 80 90 100 110 120 130 140 150
PERCENT OF RATED CAPACITY-TIRE LOAD
NON SKID TREAD DEPTH
100 90 80 70 60 50 40 30 20 10 0
FRONT TIRES SHIFTED TO REAR
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
MILEAGE IN THOUSANDS OF MILES

Tractor Service

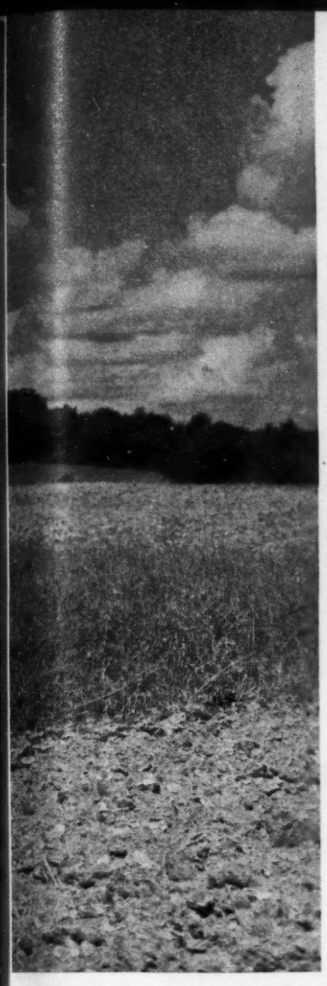
YIELDS A CROP

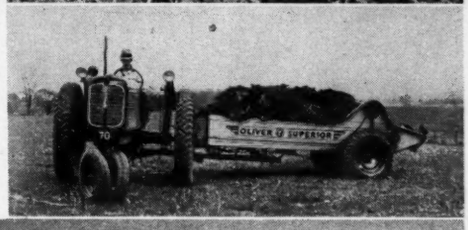
OF

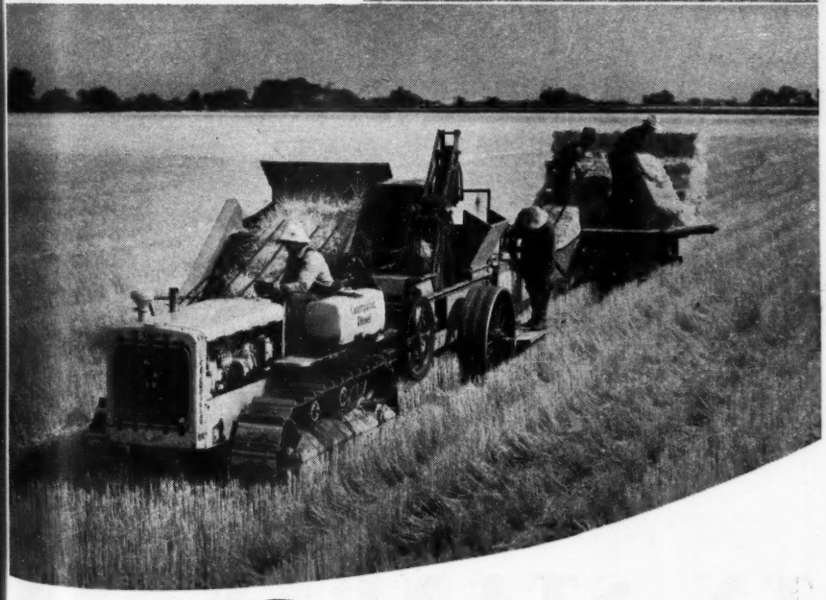
$$$



for the mechanics who make an effort to get tractor







By FRANK TIGHE

LIKE a bumper crop, farm tractors have grown in importance to the American farmer. Time was when the average farmer couldn't afford to own one, but that was before manufacturers' advanced production methods and engineering improvements brought about lower-priced tractors. With lower prices and a broader range of tractor performance, more farmers are thinking in terms of power tractors.

This, then, is a sign of good business for servicemen in or near rural areas—for tractors require frequent service. The shop that gives the farmer complete automotive service will include tractor service together with maintenance of cars and trucks.

Unlike the motor car, the tractor isn't subject to high speed performance. Yet, there are other factors which cause wear and the need for regular maintenance. Heavy hauling, all-day performance, dust and mud, all take their toll on the tractor engine.

Sooner or later, engines must be overhauled, valves ground, transmission and rear axle systems need attention, spark plugs, oil filters, batteries, tires need replacement, and many other services, common to the automobile, are required.

Right now, is the farmer's "off season." His tractor and other farm implements are covered over and stand idle until spring. Much of this equipment may need servicing. And you can get it!

Naturally, the first step in getting it is to ask for it. Ask every one of your farmer service customers for the opportunity to check over his tractors during the winter. It is the best time of the year for him, and it will certainly help keep your shop busy during the slow winter months.

Experience has shown some shop operators that farmers are somewhat lax in the care of their tractors. Furthermore, they are not inclined to bring tractors to the shop for service, as they do their automobiles. Consequently, this requires aggressiveness on the part of the maintenance merchandiser who wants a load of tractor business.

(*Continued on page* 86)

and farm implement business in their communities

NEW SAFETY STANDARDS

A MECHANIC can't do a good job if he omits some of the required steps or operations in a repair job. If he is working on an engine, performance and economy will be sacrificed. If the mechanic is doing a brake job and skips some of the essential operations, safety will be sacrificed. That is why it is so essential to check and double check every job.

As an aid to the mechanic in turning out safe brakes a committee of the National Safety Council has prepared a standard brake service schedule which is essentially a plan or check list for the brake mechanic, which when followed will

produce brakes that are safe and which will meet legal requirements.

These brake standards are complete, covering all types of brakes and auxiliary equipment for both passenger cars and trucks. The complete schedule as released by the National Safety Council is as follows:

1. Preliminary examination — free, or a charge not exceeding 50 cents.

a. Test both service and hand brakes with brake testing machine if available, or drive the vehicle on the road to determine the brake "feel," pedal pressure, deceleration, and tendency to swerve in sudden stopping.

b. Place vehicle on lift, if available, and examine brake control system for loose or defective parts. Examine thickness of lining through "feeler" holes if available.

c. Pull the front wheel with the thinner lining and examine the brake assembly. This will indicate the probable condition of the other brakes, except in borderline cases.

The above examination shows brake performance and some of the more obvious actual or impending defects. If this inspection of the owner's report indicates unbalanced braking, excessive wear, or borderline conditions, proceed with the proper inspection, adjustment and balancing as outlined below.

2. Inspection, Adjustment and Balancing of Brakes—1 to 3 hours, depending upon extent of necessary brake shoe adjustment. Items marked * require additional operations or materials with an extra carge.

a. Pull all wheels.

b. Examine linings and shoes for loose rivets, improper contact with drum, worn or greasy linings, and worn or damaged shoes. Estimate possible mileage before re-lining will be necessary.

c. Clean drums, backing plates, and brake shoes, removing all grease, dust and rust.

d. Examine brake drums for wear, scoring, eccentricity, and correct thickness. Tighten brake drums to hub bolts. Resurface or renew drums when necessary and re-line as specified in Step No 3.*

e. Examine wheel bearing condition and adjustment, quality of grease and grease seal, and renew parts when necessary.*

f. Examine and tighten backing plates and brake support. Lubricate all rubbing metal parts, including cables, but avoid excess that may cause lining to become greasy.

g. Examine brake controls.

(1) HYDRAULIC — Check for leaks in any part of system. Tighten wheel cylinders to backing plate. Examine level and condition of fluid in master cylinder, making sure that fluid conforms with recommended standards. Check clearance between master cylinder piston and pedal links.

(2) MECHANICAL — Examine cables and conduits (lubricate if necessary) and tighten conduit brackets. Check angle of levers and freedom of movement of parts and setting of equalizer bars, if used. Replace worn or frayed cables or conduits.*

h. Examine springs and tighten spring clips if used.

i. Examine and adjust hand brake.

j. Make complete adjustment of brake shoes; also of foot pedal links and master cylinder push-rod in case of hydraulic control, or cables, cross shaft levers and foot pedal position in case of mechanical control.

k. Test brakes with brake testing machine or on the road.

1. Provide owner a check list showing conditions observed and work done.

3. Inspection, Re-lining, and Balancing—3 to 4¼ hours depending upon the type of brakes and make of vehicle. This should include inspection and major adjustments under "2" plus:

a. Re-line brake shoes or ex-

(*Continued on page* 88)

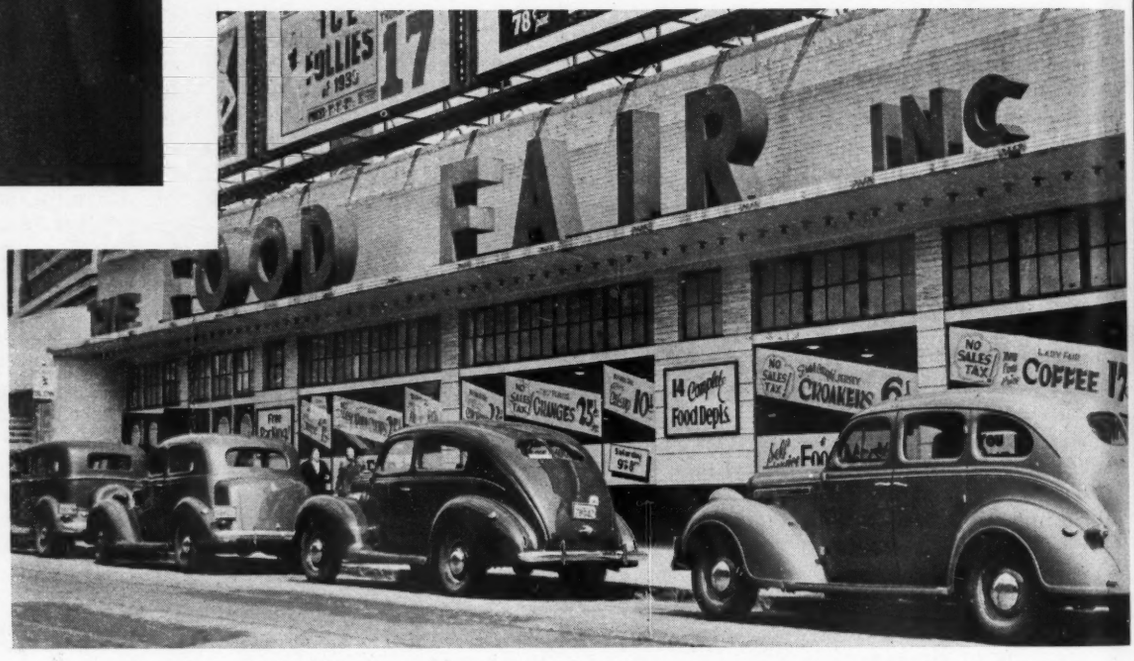
The National Safety Council Committee

Bill Toboldt, editor, MOTOR AGE, Philadelphia.
J. W. Lord, safety engineer, Atlantic Refining Co., Philadelphia.
H. H. Kelly, chief of safety section, Bureau of Motor Carriers, Interstate Commerce Commission, Washington.
Paul Dumas, service information, Packard Motor Car Co., Detroit.
David L. Gallup, chief engineer, Bendix Products division of Bendix Aviation Corp., South Bend, Ind.
W. S. James, chief engineer, Studebaker Corp., South Bend.
James J. Shanley, chief of testing division, New Jersey Motor Vehicle Department, Trenton, N. J.
Harry E. Stedman, city traffic engineer, Des Moines, Ia.
Earl J. Reeder, chief traffic engineer, National Safety Council, Chicago.

SIMPLIFY Brake Service

Here is the official brake testing procedure as announced by the National Safety Council

WOMEN LIKE



Women like to buy automotive service as they would household commodities—

They buy where service is most attractive, convenient and complete

AMERICA today has nearly 8,000,000 women drivers—8,000,000 women to whose pattern of living the automobile has become as indispensable as the kitchen stove or running water.

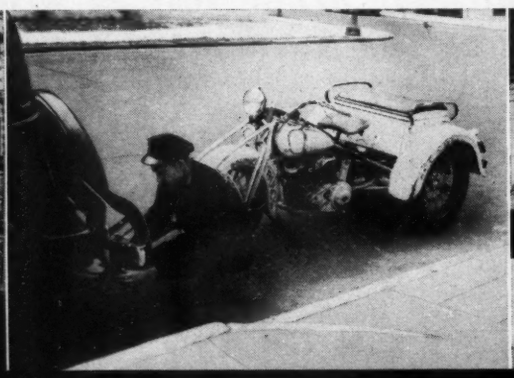
But with the convenience of the family car many women have also inherited its care. It is up to them to see that there's air in the tires and oil in the crankcase.

What kind of shop gets their business? What would women like to find in an ideal service station?

Women prefer super markets. In the city of Philadelphia, for example, super markets make up only a trifle over 1 per cent of the retail food outlets yet they do 23¼ per cent of the business. Say women, "These markets are so clean, attractive, and efficient, it's a pleasure to shop in them. We like our automobile service stations to be just as clean and attractive, even more efficient."

"We like shopping by telephone

The lady does a lot of buying by telephone—calling the grocer, druggist, department store—and favors the pick-up and



TO SPEND MONEY FOR Service

at a one-stop all-inclusive shopping center

By ROSE LU GOLDMAN

when we're too busy to run downtown. The phone brings the department store, the florist, the druggist to our side. We like the new motorcycle arrangement that brings the automotive service station to our door and does away with the old nuisance of 'Taking the car into the shop.'"

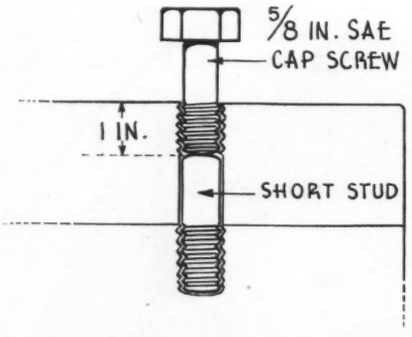
delivery dispatch from the service station

Shop Kinks

Here's your chance to pick up a little cigarette money. We'll pay three bucks ($3.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Here are some that were accepted this month:

Removing Cylinder Heads

Quite often it is very hard to remove a cylinder head, particularly an aluminum head, because it sticks and can't be lifted off the block.



I have found that, lacking the regular head puller, the head can be removed by the following procedure:

Remove four studs, two on each side.

Tap the stud hole in the head to take a ⅝ in. S.A.E. cap screw.

Screw a short stud back in the block, so that the top of the stud is at least one inch below the top of the head.

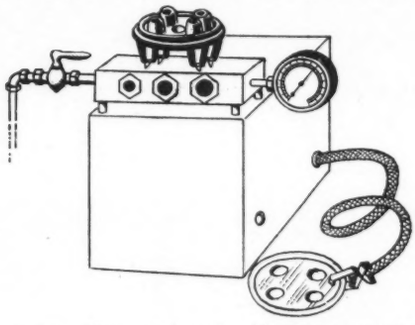
Then screw a ⅝ in. cap screw in each stud hole which you previously threaded and turn the screw down until it contacts the top of the stud. Tighten each cap screw a little at a time and the head will be forced off the block. — *Lyman J. Scherer, R.D. No. 7, Schenectady, N. Y.*

Jumps Out of Gear

I have found that complaints of 1940 Chevrolet transmissions jumping out of high gear can be easily corrected. This condition is usually due to the operating lever clamp bolt, which holds the reactionary lever system to the transmission operating lever shaft, being loose. This permits the reactionary lever to work on the operating shaft. Simply tightening this bolt will correct the trouble.—*Earl E. Hiteshue, c/o Central Motor Co., Hamilton, Ohio.*

Testing Cracked Caps

An easy way to test for cracks in the distributor cap as used on the Ford car is to cut four holes in a lid of a tin can, connect the lead of the



spark plug tester to the lid, set the cap on the spark plug tester as illustrated, and place the lid over the outside terminals. Then, when you push the tester button, sparks will jump to the lid if there are any cracks in the cap. — *W. L. Tompkins, 2819 N. Luna Ave., Chicago, Ill.*

Windshield Glass

When installing one side of a V-type windshield and you have trouble keeping the rubber weatherstrip in place, just put it on the glass and then fasten it in place with strips of masking tape about 12 in. long. Leave the ends free so they can be used as pull-handles, and you can work the glass in with ease. After it is in place, cut off the masking tape with a razor blade and the job is completed.—*Ray O. Wilbur, Carlisle's Garage, Manchester Center, Vt.*

Repairing Gas Tank Leaks

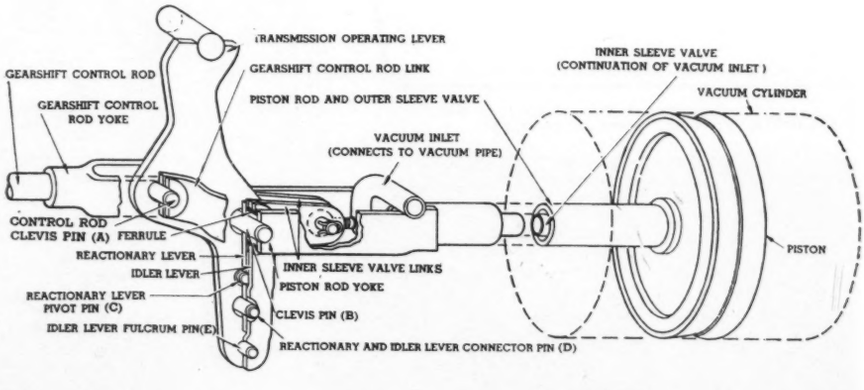
Pin-hole leaks in the gas tank are easy to fix if you follow this procedure:

Tin the area surrounding the hole with a hot soldering iron.

Run an ice pick into the hole to enlarge it to the size of a tinner's rivet (about ⅛ in.).

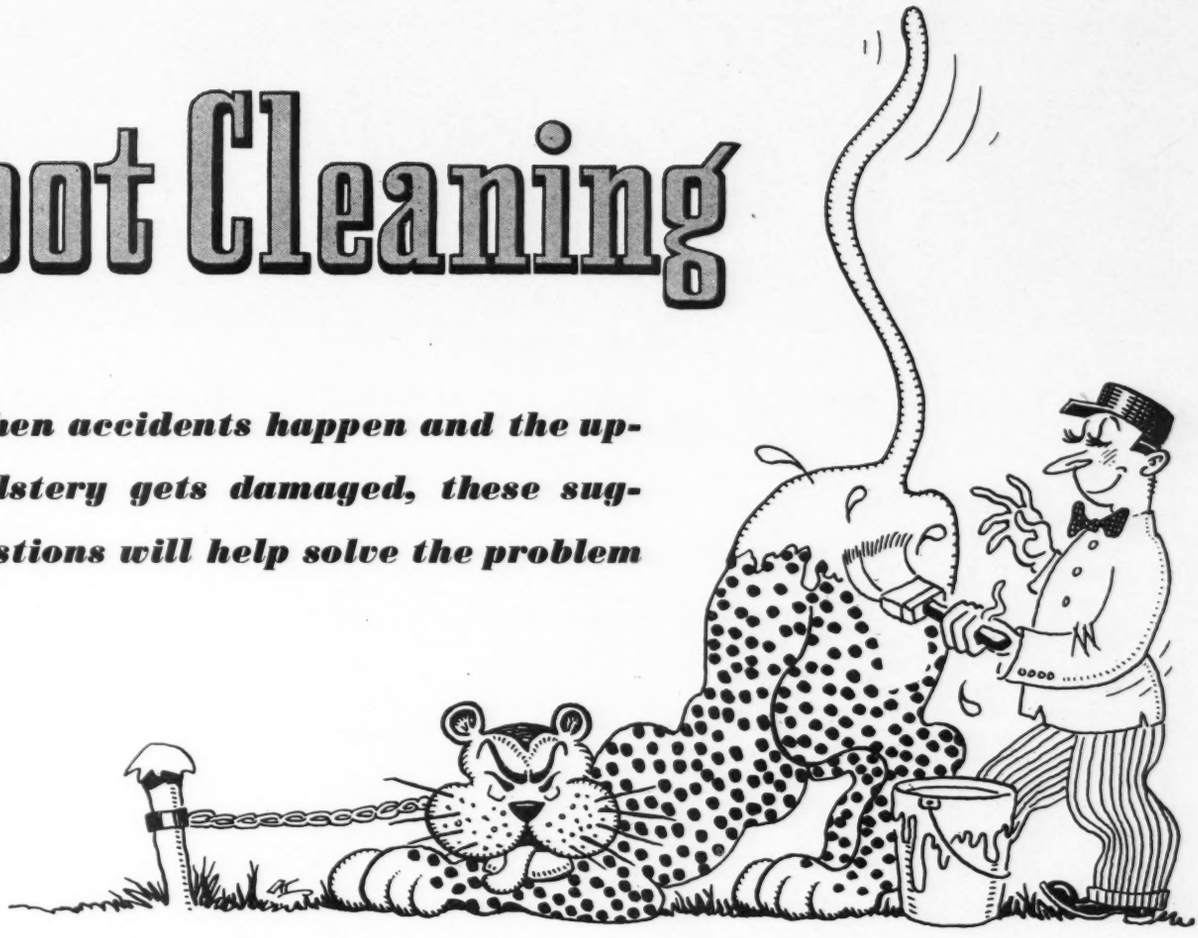
Install the rivet in the hole and solder it to the tank.

Job can be done in a very few minuntes, and without draining the tank. —*Ivo V. Pennington, Wauneta, Neb.*


TRANSMISSION OPERATING LEVER
GEARSHIFT CONTROL ROD
GEARSHIFT CONTROL ROD LINK
GEARSHIFT CONTROL ROD YOKE
PISTON ROD AND OUTER SLEEVE VALVE
INNER SLEEVE VALVE (CONTINUATION OF VACUUM INLET)
VACUUM CYLINDER
VACUUM INLET (CONNECTS TO VACUUM PIPE)
CONTROL ROD CLEVIS PIN (A) FERRULE
REACTIONARY LEVER
IDLER LEVER
INNER SLEEVE VALVE LINKS
PISTON ROD YOKE
REACTIONARY LEVER PIVOT PIN (C)
CLEVIS PIN (B)
IDLER LEVER FULCRUM PIN(E)
REACTIONARY AND IDLER LEVER CONNECTOR PIN (D)
PISTON

Spot Cleaning

When accidents happen and the upholstery gets damaged, these suggestions will help solve the problem



CLEANING spots from the upholstery is not such a tough job if you know what to use and how to use it. Every repair shop should know how to do this work.

Keep a "first aid" kit of cleaning materials on hand. This can be made up of a plentiful supply of clean rags, a bubble cleaner, carbon tetrachloride, a non-alkaline soap such as Ivory or Lux, blotting paper, and household ammonia water. (Bubble cleaners are those cleaning solvents that clean by "shampooing" the fabric. If not available, soapsuds can be used.)

There are two rules that must be followed when attempting to remove spots: first, the cloth used to apply the cleaning solution must be clean; second, rub with a circular motion, starting outside of the spot and gradually work toward the center. This method keeps the spot from spreading, and is less likely to leave a ring.

In the first place you must know what caused the spot or stain. Knowing that, the application of the right cleaning solution to take it out is a simple matter. By following these suggestions you will have no trouble in removing all evidence of the damage.

PAINT AND ENAMEL

If wet, rub with a clean cloth wet with turpentine. If dry, use a mixture of one part denatured alcohol and one part benzine. Saturate the spot and work out as much paint as possible with a dull knife. Rinse with lukewarm soapsuds and follow by sponging with a cloth wet with cold water.

GREASE AND OIL

Use carbon tetrachloride. Pour a small quantity directly on the spot and rub gently with clean cloth, working in toward the center of the spot. Then press a clean blotting paper to the dampened area. Continue pressing clean portions of the blotting paper over the spot until paper shows no stain. After the fabric has dried, rub over the spotted area with warm water soapsuds or a bubble cleaner.

SHOE POLISH

Use carbon tetrachloride for black or tan polish. If white shoe dressing, allow to dry and then brush off the fabric with a stiff brush. Then moisten with cold water and when dry, brush again.

BLOOD

Use cold water and ammonia. Pour ammonia directly on the spot, and rub with a clean cloth and cold water. Never use hot water and soapsuds on a blood stain!

CANDY, ICE CREAM AND FRUIT

Use hot water and soapsuds or a bubble cleaner, and scrape with a dull knife to remove particles of candy. When dry, sponge with carbon tetrachloride.

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

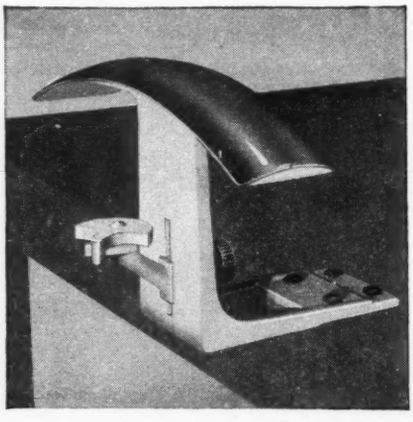
Pocket-size Battery Tester

The Kathanoid Corp. of New York and Chicago has made available to all dealers a new type battery tester known as the pocket Batrecheck. This instrument is handy to carry around in the pocket, and can be clipped on the battery posts or directly to the starter connections instantly. When handed to the owner or laid on the

seat of the car, it gives the operator of the car an instant analysis of the condition of his battery. The dial is calibrated to show "Discharged," "Partly Charged" and "Fully Charged" so the owner instantly understands the reading.

Thompson Tire Holder Simplifies Regrooving

The problem of holding an unmounted tire while regrooving it has been simplified by the introduction of a tire holder or grooving stand by O. E. Thompson & Sons, Ypsilanti. Mich. This sturdy holder is made of cast iron with nothing to get out of order. A special locking cam clamps one bead of the tire, holding it firmly in place while grooving, and automatically releases to permit movement of the tire. Price $9.50.

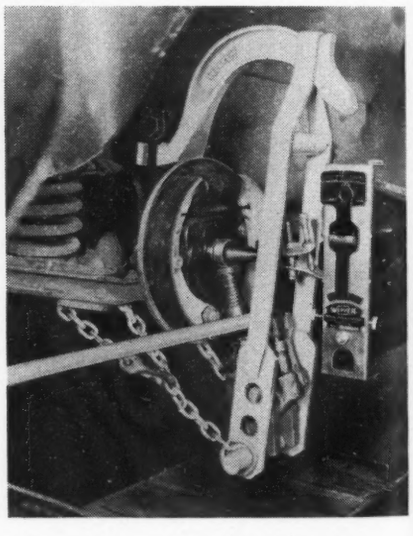


Ready Cash

Designed so that it can be attached to the windshield by a suction cup, this handy gadget made of rubber holds coins easily accessible for bridge tolls, newspaper money, etc. When full it will hold a half dollar, quarter, nickel and two dimes. Space for advertising message provided. Le Roco, Inc., 235 West 55th St., New York City.

Camber Correcting Tool

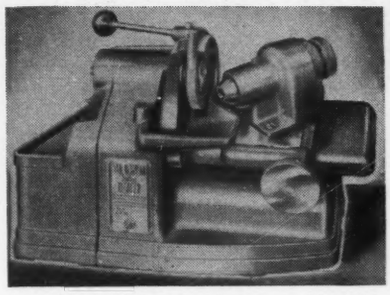
The Weaver Mfg. Co., Springfield, Ill., has developed a camber correcting tool for use on knee-action cars. It is designed to reduce or increase camber by bending the steering knuckle support arm in those cases where the adjustment provided by the eccentric pin is not sufficient to make the proper correction of the



camber angle. Illustration shows the tool used to reduce camber. The Weaver camber-caster-king pin gage shown with the tool is a separate instrument, and is not included with the camber correction tool.

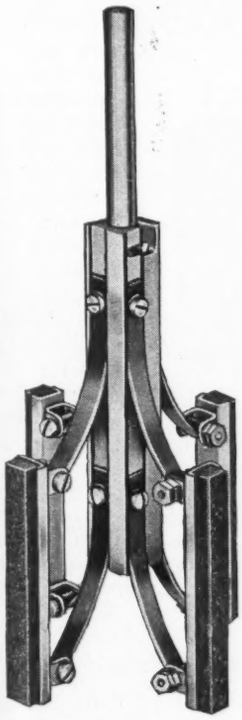
Wet-Grinding Valve Refacer

A new wet-grinding valve refacer has been introduced by the Van Norman Machine Tool Co., Springfield, Mass. Model ARW, illustrated, takes all valves from 15/64 in. to 9/16 in., features an adjustable workhead, positive impeller pump, and adjustable rapid traverse lever. Four models are offered in the line, each having



the Van Norman split double-grip collet, high speed check release, and adjustable workheads, ways and levers.

Hone Offered With Piston Ring Deal



The Hastings Mfg. Co., 375 E. Mill St., Hastings, Mich., is offering the new hone, illustrated, to repairmen with a minimum assortment of Hastings Steel-Vent piston ring sets. This hone is a super-finishing tool to be used in conjunction with a ridge reamer. It removes high spots, variations and glaze from upper cylinder bore. The extra fine stones do not remove an appreciable amount of metal, but rather burnish and resurface the cylinder. It is operated by any ½-in. electric drill, and automatically expands to fill all cylinders from 2 11/16 in. to 4⅛ in.

Rotary Lift Has New Features

The new advances in lift construction designed to cut servicing attention are claimed for the new Rotary lift made by the Rotary Lift Co., Memphis, Tenn. One is an exclusive automatic air bleeder for car lifts that removes air pockets from the jack, thus preventing jerky movement during travel. The other is the use of babbitt lined, heavy steel bearings, which is claimed to provide several new operating advantages.

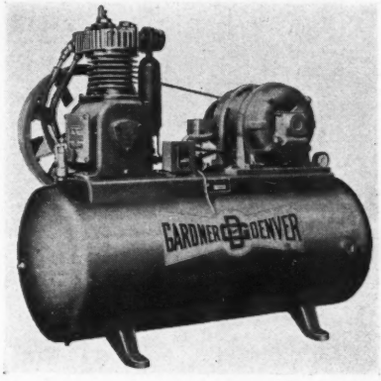
Wrench Set

A set of 12 "Superrenches" with 24 different openings is being featured by J. H. Williams & Co., 225 Lafayette St., New York City. Openings are at 15 deg. angle to permit complete rotation of the nut in a limited space.

Wrenches will fit all sizes of nuts, S.A.E. Standard ¼ in. to 1⅛ in.; U. S. Standard ⅛ in. to 1 in., and American Standard ¼ in. to 1 in., and cap screws ⅛ in. to 1⅛ in.

Gardner-Denver Announces Line of Air Compressors

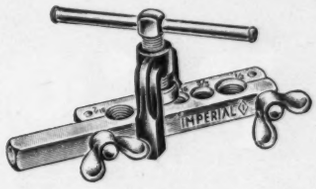
The Gardner-Denver Company, 100 Williamson Street, Quincy, Ill., has announced a new line of air compressors for service station and repair shop use. This line includes both single and two-stage models. The single



stage, duplex compressor is equipped with motor, V-belt drive, air receiver for 200 lb. working pressure, automatic start and stop control. It also has a pressure gage for air receiver, needle valve for discharge line and 200 feet of air hose with tire chuck.

Tube Flaring Tool

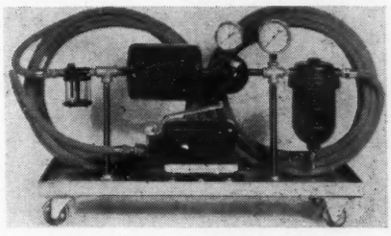
One of the newest products of The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill., is the Speedy Flaring Tool designed for flaring copper, brass and aluminum tubing. Two sizes are offered, one to handle tubing from 3/16 in. up to and including ½ in., and the other from ¼ in. up to and including ⅝ in. A



special feature of this new tool is its yoke which is made so that it can be slipped directly over the bar without twisting or turning.

Sterling Sander Saves Time

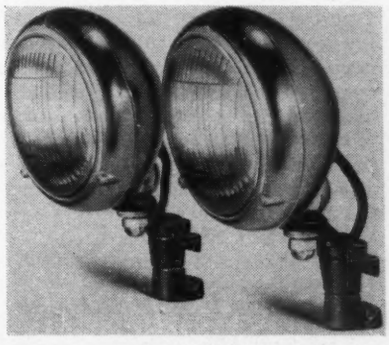
Refinishing with synthetic enamels means that special care must be used in producing a satin-smooth surface before applying the enamel. The manufacturer of the Sterling Speed-Bloc Sander, the Sterling Tool Products



Co., 363 East Ohio Street, Chicago, Ill., states that this sander will do the job with a saving of abrasives and time. It operates on 60 lb. of air at 3000 oscillations per min., and weighs 5½ lb. Complete information and descriptive literature will be sent upon request.

Auxiliary Lights By Auto-Lite

Auxiliary driving and passing lights made with sealed beam light units have been announced by The Electric Auto-Lite Co., Champlain & Chestnut Sts., Toledo, Ohio. Driving

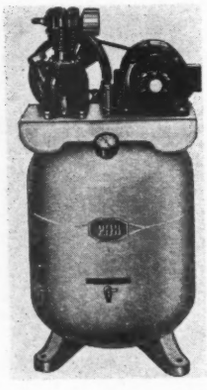


and passing units with clear lenses, recommended for cars prior to 1940 are interchangeable with amber Fog-Lite units recommended by the manufacturer for 1940 and 1941 models.

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Vertical Air Compressor



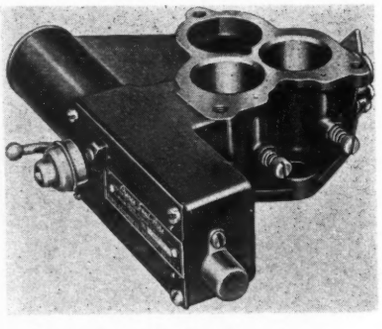
The Modern Equipment Corp., Defiance, Ohio, has announced its new ½ hp. Par Air Compressor. The receiver tank on this new model is larger in diameter and shorter in height than ordinarily used on small air compressors. It is a full 30-gallon capacity tank, with sub-assembly of motor, pump, pressure switch and drive. It has a 2-cylinder compressor with displacement of 2.5 cu. ft. per minute, finned type aftercooler, V-belt drive, repulsion induction motor and two-pole pressure switch.

Edison Spark Plugs

An addition to the complete line of Edison spark plugs has been announced by the Edison-Splitdorf Corp., West Orange, N. J. The newest member of the line is a 10 mm. plug. In the design of the Edison HC High Compression plug, all of the advantages of the small 10 mm. or "racing type" plug are combined in the various shell sizes eliminating the use of bushings or adapters, and providing maximum efficiency in all high compression motors regardless of the size of spark plug specified, according to the manufacturer.

Governor For Ford Cars

The Seal-Aire governor made by the Pierce Governor Co., Anderson, Ind., permit of manual control of the duplex butterfly valves at all speeds below the governed point, but controls the positions of the valves by vacuum at the governed speed made possible by a unique wear-proof clutch. The governor mechanism consists of a piston, opposed by scientifically calibrated springs which, through accurately balanced linkage, are connected to the butterfly valve shaft. A long range speed adjustment is also provided with provision for sealing. At all speeds below the governed point the driver has full control of the butterfly valves, and may accelerate or decelerate at will. But when acceleration brings the engine speed up to the governor setting, the governor piston moves to declutch the manual control and to regulate the position of the valves to hold the engine speed at a near constant under the varying conditions of load.

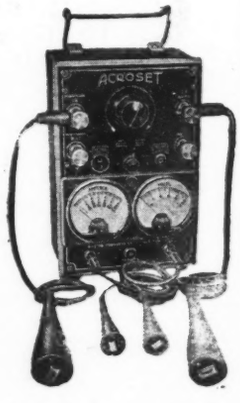


Shaler Tune-Up Package

The Shaler Company, Waupun, Wis., is now offering to the trade the Tune-Up Package which combines Karbout and Rislone in a dual compartment container. As both Karbout and Rislone are used as companion products in motor tune-up work, this handy package provides a convenient means of selling and using these products. In addition, other Shaler products have been announced, together with a new book "Engine Performance" covering the Diesel engine field as well as automotive engines.

Test Set Improved

The Electro Products Co., 621 East 216th St., New York City, has a new model of the "Acroset" introduced a short time ago. This new model, a combined voltmeter, ammeter and variable resistance set, is designed to accurately set or check relays, regulators, charging rates, to take readings for voltage drop at connections and to check current draw in lamps, accessories, etc. The voltmeter has a range of 0-1, 0-10, 0-50, while the ammeter has four scales, 0-30, 0-50, 0-300, 0-1200.



Oakite Parts Cleaner

A newly developed material designed for cleaning or stripping paint from generator housings, shock absorbers, carburetors, fuel pumps, brake shoes, clutch parts and other similar automotive parts before repair has been announced by Oakite Products, Inc., 22 Thames St., New York City. Known as Oakite Stripper M-3, this new material is reported to provide effective grease and oil removing properties with rapid paint stripping action. It is a dry, white, free-flowing material fully soluble in water and is used in heated cleaning tanks.

Gear Cleaner Works Quickly

The Dee Tee Vapor Cleaner is a new type differential and transmission cleaner recently developed by the Circo Products Co., 3088 West 106th Street, Cleveland, Ohio. It works on the heat-vaporization principle; the

vaporized solvent cools to a liquid when it strikes the metal, penetrating the old grease and accumulated tars and gums, washing out the foreign matter through the drain plug. It is said that less than 10 minutes are required to thoroughly clean the transmission or differential.

Pocket-Size Tester for Generators and Regulators

Announcement has been made by Burton-Rogers Co., 857 Boylston St., Boston, Mass., of a new generator-regulator tester known as the Hoyt GT/4 tester. Small enough to slip

into the coat pocket, yet of extreme accuracy, the new Hoyt tester is priced to dealers at $14.25. The volt-ammeter is said to be accurate within 2 per cent; it is the moving-coil type with a range of 0-60 amperes and 0-15 volts. Has black bakelite case and is equipped with a hanger for hooking over the radiator tie-rod.

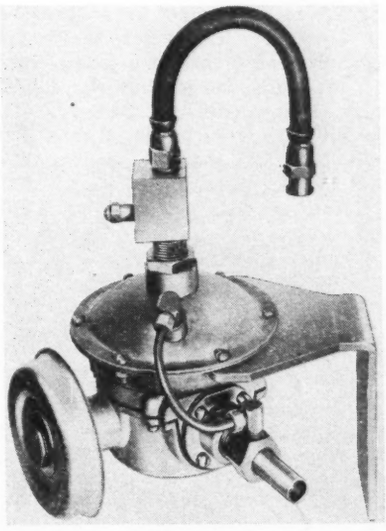
Willard Rental Batteries

The Willard Storage Battery Co., Cleveland, Ohio, has introduced a line of rental batteries which are especially designed and built to withstand the rough wear of rental service. They feature a new case design, contain more active materials and are equipped with lead insert posts. They are furnished in four models to fit practically all makes of cars.

In addition to the rental line, Willard has also announced an 8-volt starting battery for road service use.

Relay Valve

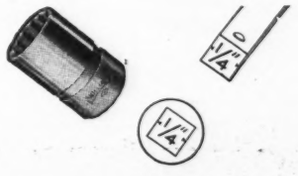
The new B-K hydraulic relay valve just announced by the Bendix Products Division of Bendix Aviation Corp., South Bend, Ind., serves primarily as a means of operating vacuum power trailer brakes directly from the hydraulic line of the tractor when the tractor is not equipped with power brakes. The valve includes a



hydraulic piston through which the pressure in the tractor brake lines operates a poppet type vacuum graduating valve assembly, which, in turn, controls brake application through vacuum lines running to the trailer power cylinder.

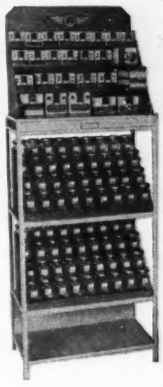
J. H. Williams Announces Standardized Sockets

J. H. Williams & Co., 225 Lafayette St., New York City, manufacturer of detachable "Supersocket" wrenches, announces that in the interest of standardization they have changed the size of drive in their Midget Pattern.



Socket wrenches and parts in this classification are now being manufactured with ¼ in. square drive, superseding the 9/32 in. square drive previously made. Old and new sockets and parts are readily interchangeable by means of suitable adapters.

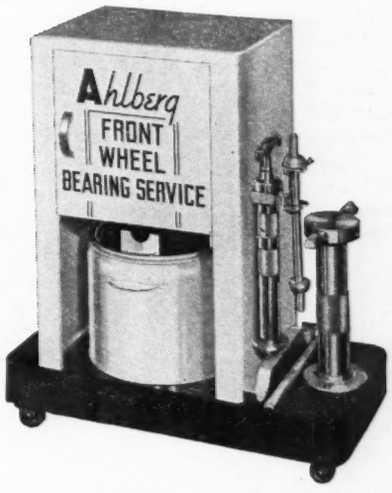
P & D Display Cabinets



The new P & D unit type display cabinets enable service shops to build their own ignition, wire and cable departments. From these displays it is easy to arrange a series of stock combinations to meet the requirements of all kinds of shops from the largest to the smallest. For information and prices write the P & D Mfg. Co., Long Island City, N. Y.

Bearing Service Unit

The improved version of the Ahlberg front wheel bearing service unit for 1941 is now available. A new white enameled washer, re-grouping of all tools at one side, and the addition of easy-roll casters are outstanding features of the new model. The



unit consists of a complete set of front wheel bearing tools, the bearing washer, storage space for a stock of fast-moving bearings and a display stand. Product of the Ahlberg Bearing Co., 4741 South Whipple St., Chicago, Ill.

Hydraulic Bumper Jack

The new hydraulic bumper jack announced by Marquette Mfg. Co., Minneapolis, Minn., has a lifting range of 15¼ in., a low position of 3⅝ in. and a high of 30⅞ in. There are 13 positions for the lifting hook, making the jack adjustable to any height desired. Operation is hydraulic, with a rubber grip on the operating handle. To lower the jack it is only necessary to release the thumb screw at the top.

NEWS

Third Highest Production Year

Nineteen forty automobile production will go down in the record books of the industry as the third highest in history with an output of 4,690,000 motor cars and trucks, according to preliminary estimates. This has been surpassed only by 1929, when 5,621,715 vehicles came off the assembly lines in the U. S. and Canada, and by 1937, when the total was 5,016,437. Production was 25 per cent greater than in 1939.

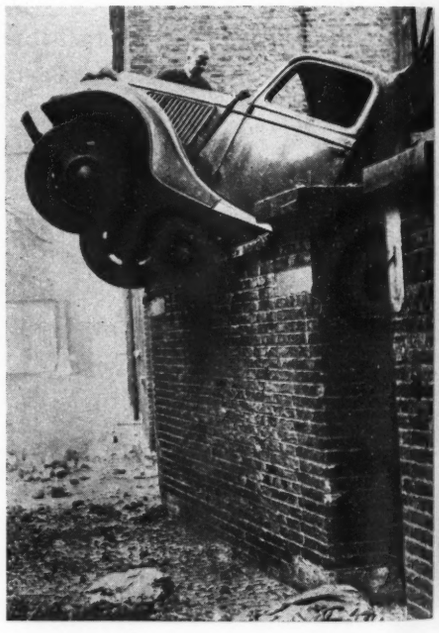
December production was the second highest in history with a total of approximately 510,000 motor cars and trucks during the month. This was exceeded only by December, 1936, when output was 518,958 and was 9 per cent greater than the last month of 1939, which was the largest productive month for that year.

Indicative of the production rate during 1940 was the fact that the Chrysler Corp. produced its millionth car of the year Dec. 9 when a Plymouth rolled off the production line in Detroit and was delivered to a California woman, who planned to drive it back to the West Coast. Only in two other years since the company's founding 15 years ago, 1936 and 1937, has the million mark been surpassed by Chrysler. Chevrolet, which has been producing cars at a rate of close to 6,000 daily, turned out No. 400,000 of its 1941 models on Dec. 19. The 400,000 cars were produced in a little more than 3½ months, production of 1941 models starting Sept. 3.

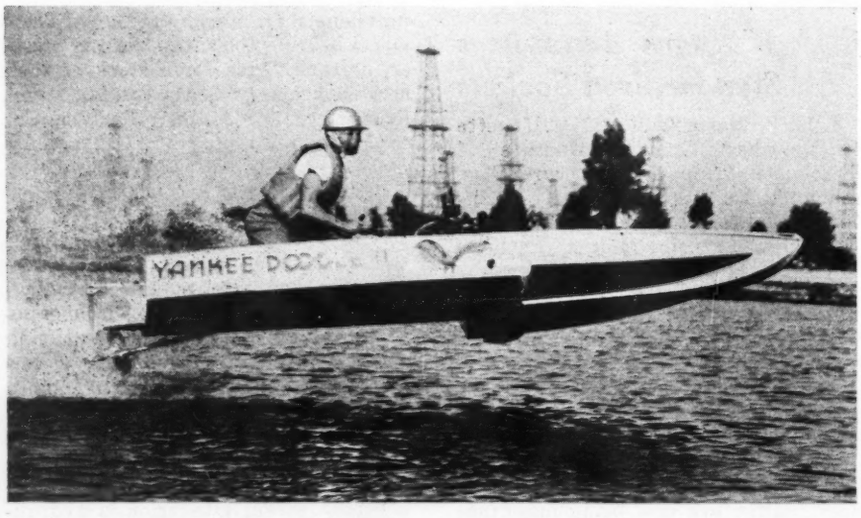
Retail sales of new passenger cars and trucks set a new record for November with delivery of 391,868 vehicles by dealers, according to the Automobile Manufacturers Association. This was 29 per cent ahead of the 303,204 vehicles sold in November, 1939, and slightly higher than the 379,749 new cars sold in October, 1940. New passenger car sales for November were up 34 per cent compared to the previous year, while for the 11 months of 1940 they showed a 28.4 per cent increase. New truck sales increased 25 per cent in November compared to 19.4 per cent for 11 months. With the advent of unseasonable weather in the North, retail sales dropped off somewhat in the early part of December but they still

(*Continued on page* 81)

MIDGET MIDGETS among race cars are these tiny, gasoline-powered jobs. Roy Richter's little car traveled a mile circular course at 67 m.p.h. at Los Angeles recently.



BOMBED A freak of a recent Nazi bombing of London—this motor lorry was lifted from the street and blown bodily to the top of the wall by force of the bomb explosion.

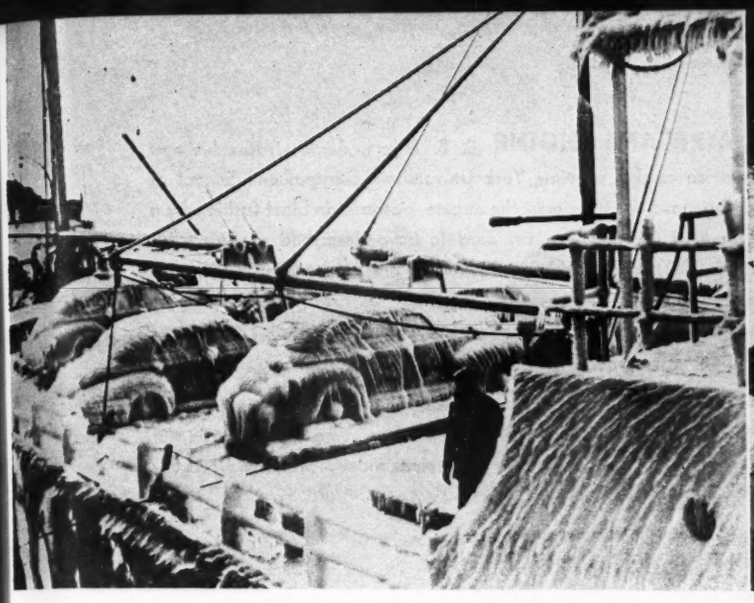


RECORD SPEEDBOAT The world record speedboat is shown during a tune-up is Yankee Doodle II which recently established a world's mark for its class. Driven by Roy McCullough, builder and designer, it has a 135 cu. in. piston displacement and holds the title record of 56.639 m. p. h.

Southwest Automotive Show Big Aid to Service Trade

Official space drawing for the 4th Annual Southwest Automotive Show has been held. The Show will be held in the Will Rogers Memorial Coliseum, Fort Worth, Texas, Feb. 6-9. 170 manufacturers took 307 booths, or 95 per cent of all available exhibit space. A total sellout seems certain.

Every effort is being made by the Southwest Automotive Show management to assist the manufacturers in presenting their merchandise and sales programs. Aids are offered in promoting contacts with prospects



ICE SCULPTURE Thousands of cars are shipped out of Detroit by way of the Great Lakes. The wintry waves on Lake Erie left these sculptured in ice on the frozen deck of the freighter, Fernie, plying between Detroit and Sandwich, Ontario.

BURIED BY BLIZZARD These are fourteen of the twenty-five automobiles that were snowed in at the height of a gale and blizzard, in Minnesota recently. Eventually rescued, the cars had to be thoroughly checked over by service men.

TROLLEY FUNERAL Miami, Fla., joined over 200 other cities in the U. S. in doing away with street cars in favor of motor busses. Citizens held a "last mile" parade with mock funeral services for the last of the flat-wheelers.

WILLYS FOR DEFENSE Willys-Overland Motors, Inc., has received a War Department order amounting to approximately $1,500,000 for 1500 of these light reconnaissance cars. The new unit is designed around the Willys American engine.

and in providing jobbers' salesmen with effective sales ammunition. Printed Sales Conference Schedules for recording meetings and appointments, prospect blanks, free chair service for sales meetings, and numerous other services are available without cost to the exhibitor in helping to present his program.

To date over 100 jobbers throughout the Southwest are enrolled as sponsors, in each instance paying a fee for the privilege, thus giving him a financial interest in the enterprise.

A comprehensive publicity program to the automotive trade will soon be released throughout the Southwestern territory. On the basis of past attendance, 20,000 members of the industry and trade is anticipated for the four days and nights of the show. Lionel J. Ellis is show manager.

Expand Program of Service Education

J. H. Mack, general service manager, Chrysler Corporation, has announced an expanded program of technical education for Dodge, De Soto, and Chrysler dealers' service men.

"Our 1941 model technical meetings were completed in December," said Mack, "and, with over 30,000 dealers' service men having attended the 500 or more meetings, we feel encouraged to continue and further develop this mechanical training.

"District Service Representatives will now begin holding individual technical schools in dealers' service departments," continued Mack. "In this way, we will be able to give more time to the individual mechanic, and with the use of newly developed equipment can be sure each service man becomes conversant with 1941 service methods."

NEW AIRPLANE ENGINE E. B. Myers, demonstrates his new type aviation engine at New York University's Guggenheim School of Aviation. According to reports, the engine, powered in blast fashion by a new fuel which Army experts are said to have described as being "as powerful as TNT," could add 85 per cent to present bomber loads, save one-third of the time and distance now used for take-offs and adds as much as 200 miles an hour to possible speed bursts of fighter planes.

CARBURETOR CAVALRY These ladies are members of Canada's Women's Service Corps and are shown receiving instruction in the operation of a motorcycle, as part of their training. They take instructions in drilling, motor transport, signalling and first aid. (below)

FORD "PYGMY" First of the new Ford "Command-reconnaissance 4-4's" designed to replace motorcycles and side cars in the army's new mechanized divisions. (bottom of page)

Ford to Build "Pygmy" Trucks for U. S. Army

Manufacture of a fleet of "pygmy" trucks which bear the formidable U. S. Army designation of "command reconnaissance 4-4's" is now under way in several automotive plants. The Ford Motor Co. expects to begin manufacture of its version of these tiny but powerful vehicles early in January, having received a government order for 1500 of them valued at $1,387,500, or $975 apiece.

American Bantam Car Co. of Butler, Pa., has delivered 70 of these combat cars on an initial order for 1500. Continental Motors Corp. has a $294,662 order for 2000 four-cylinder, 40-hp. engines which it is making at its Muskegon plant and which will be installed in the Bantam trucks.

The "pygmy" vehicles, which weigh approximately a ton, will be used to do the job performed by motorcycles and sidecars in the Nazi Panzer divisions. If the first ones prove successful, the Army plans a fleet of 30,000 of these cars. Their four-wheel drive provides them with plenty of traction for the most rugged terrain and they are capable of traveling 60 m.p.h. Their light weight will make it possible to transport two or three of them in a transport or bombing plane, providing a very mobile unit.

The trucks are designed to carry three men and a machine gun but they can be used in hauling light field pieces or quick transport of troops. The Ford version utilizes an adaptation of the Ford tractor engine, 42-hp. and with four cylinders. A feature of the four-wheel drive is the fact that the front axle can be used either as a driving axle or an

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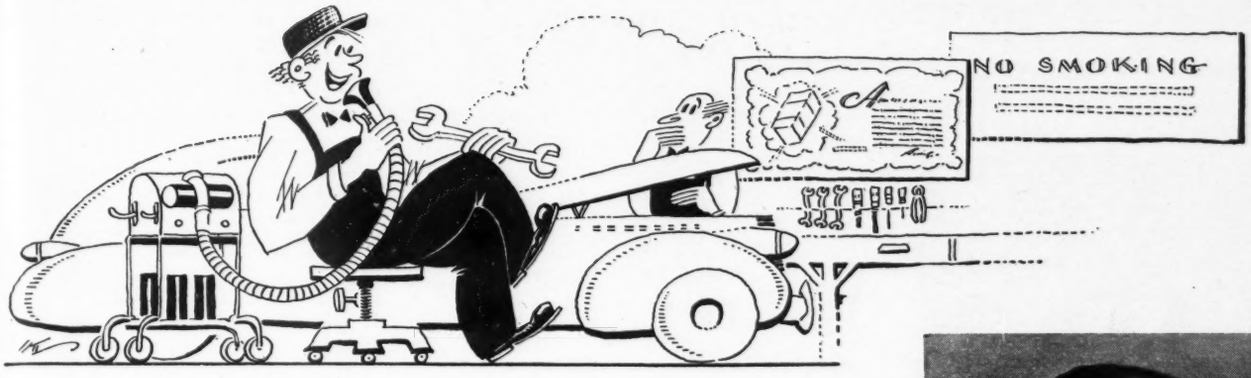


THE READERS'

CLEARING HOUSE

of Servicemen's Queries

Bill Toboldt, Editor, Motor Age

When it "stumps" you — Write Motor Age, Readers' Clearing House

Radiator Service

We are contemplating installing a complete radiator repair department along with our service department. Please give us some information as to the best type equipment we will need. —Richardson Motor Co., Jonesboro, Ark.

TO the best of my knowledge there is no company manufacturing complete radiator repair equipment. Of course, there are radiator flushers made by several companies, but these are designed to do the job without removing the radiator from the car.

All the radiator departments that I have seen have been home-made affairs built by the mechanic. In general, they consist of a large tank for holding water and in which the radiator can be submerged so that it can be tested under air pressure to locate leaks. These tanks are built of wood and then lined with either zinc or sheet-iron. Naturally if sheet-iron is used it would be necessary to give it several coats of paint to prevent rust.

For boiling out the radiator, another tank is required. This tank has to be of metal and underneath the tank is placed a gas burner for heating the solution. A small pump, driven by an electric motor, is then used to pump the solution through the radiator core.

The additional equipment consists mainly of small hand tools, soldering iron and torches.

Hard Riding

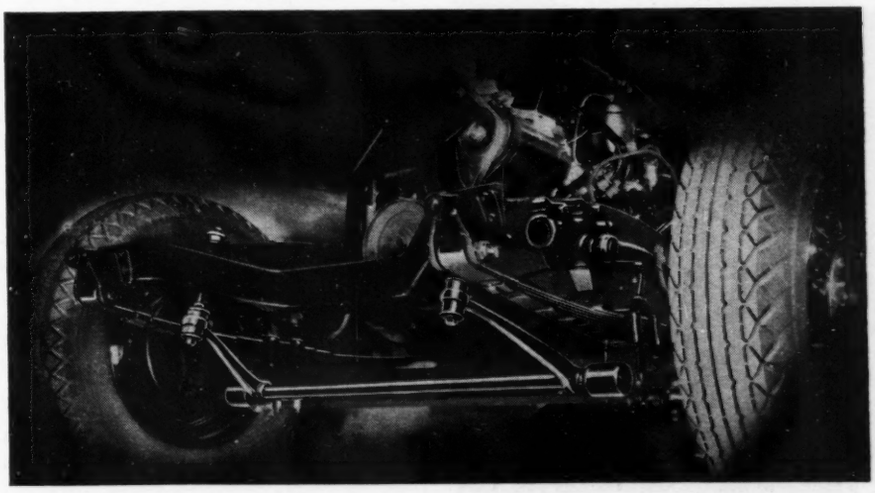
I have a 1935 Plymouth two-door sedan that rides mighty hard. Can you tell me what I can do to improve the riding qualities of this car?—A. L. Labahn, Lincoln, Mo.

THE trouble you are experiencing with the riding qualities of the 1935 Plymouth is probably caused by clogged jets in the shock absorbers, or lack of proper lubrication of the springs.

However, before doing any work on the springs and shock absorbers, make sure that the tires are all inflated to 30 lb. pressure. Incidentally, new tires with plenty of tread will make the car ride better than a tire that is nearly worn out.

If the springs are badly rusted it might be necessary to disassemble them and clean the leaves and then apply a graphite grease. If they are not so badly rusted, simply spray them with a penetrating oil should it be necessary.

However, your trouble is most likely to be found in the shock absorbers, which should be completely dismantled and cleaned and then rebuilt and refilled with the proper fluid. Installation of larger jets will, of course, make a softer ride.



RECOGNIZE THEM?

Here are a few famous automobile nameplates and emblems. Names have been blanked out, but see if you can recognize them. Identification will be found on page 96.

Bleeding Brakes

Here is the way I bleed brakes. Have someone push the brake pedal fast five or six times in succession, and hold the pedal down on the last stroke. Then open the bleed valve quickly, and close it quickly as soon as the air pops out. Do the same operation on each wheel.

I have found that I can bleed brakes this way and not use a bleed hose.—*N. Hickey, 2769 W. 6th St., Los Angeles, Calif.*

Removing Water Pump

When you have to remove the water pump from a 1937 to 1940 Chevrolet, you will find it much easier if you will remove the top radiator hose connection at the radiator and remove the thermostat housing from the front of the cylinder head. Then, when you remove the four cap screws holding the water pump to the block you can lift up and remove the water pump and fan as a complete assembly. This saves the time of removing the screws holding the fan blades to the hub, which takes time because there isn't room to work between the fan and the radiator core. *Eugene Monetti, 623 N. Charles St., Carlinville, Ill.*

Overhauled, But Knocks

I recently worked on a 1939 Dodge, to correct excessive oil consumption. The car had been driven 32,000 miles.

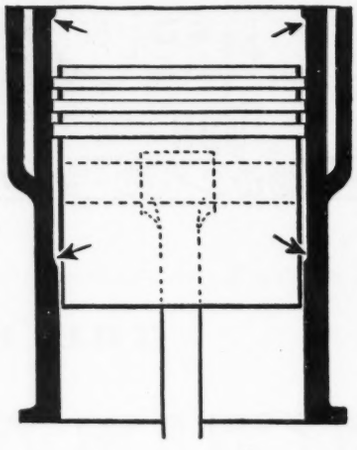
I installed new rod bearing inserts, new rings (after removing the cylinder ridge), cleaned carbon and ground valves, and used all new gaskets.

Here is the trouble: From about 25-30 miles per hour there seems to be a kind of rattling noise or knocking in the motor, but it shows up at some times and not at others. You can race the motor on the stand up to about 40 or 50 m. p. h. and then let it drop back to idle, and it sounds something like a broken piston. I don't think it is ring blow-by, because you can hear that too. I did not install expanders because the pistons were in good shape. You can't short the noise out by the plugs.—B. R. Wood, Bellmont, Ill.

I think the most likely cause of the noise you are experiencing on that 1939 Dodge is piston slap. This will usually show up on cars that have been overhauled, after the installation of rings. Until the rings are worn in a little bit you are apt to get a piston slap condition or a pin knock. After five or six hundred miles, this generally disappears.

There is also a possibility that the new rings are striking a ridge at the bottom of their travel. I understand, of course, that you have removed the upper ridge, but sometimes there is a lower one which the rings will strike. In addition, it sometimes happens that the upper ridge is cut out too much with the result that the rings will strike, causing a knock.

There is also a very strong possibility that when you installed the



cylinder head you pulled the nuts so tight as to distort the cylinders. I think the first thing that I would do would be to get a tension wrench and then after first pulling up on all the cylinder head studs, retighten them by means of the tension wrench. I know that in many cases this has smoothed out a rough and knocking engine.

In addition, there is a possibility that you have the spark advanced too far. Of course, in most cases, an advanced spark will result in a ping. However, when the engine is clean, an advanced spark sometimes sounds more like a rattle.

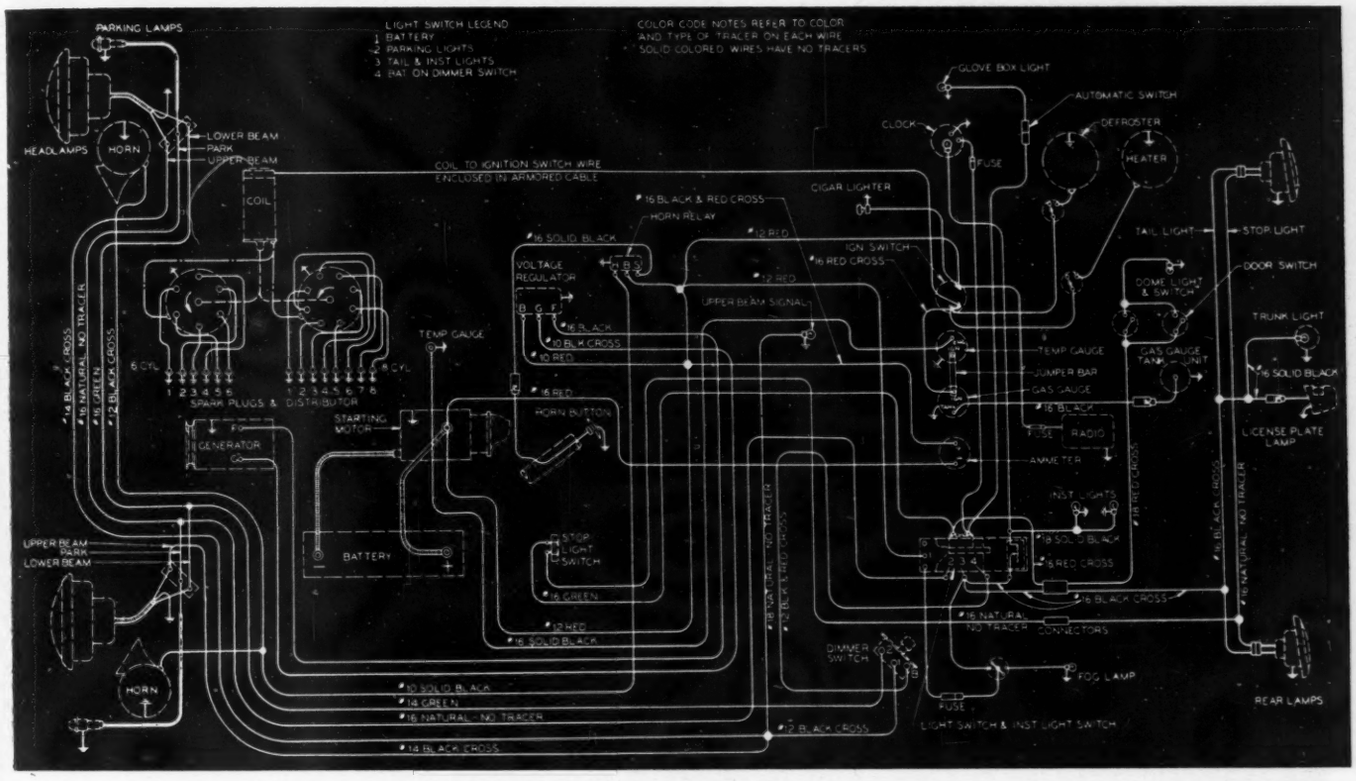
Mechanic Gives Views on National Defense

I have just been listening to the Chicago Round Table radio program, a discussion of National Defense (Dec. 15), and am in accord with one of the members who feels that the so-called shortage of skilled labor is a lot of hooey. Where in all the world is to be found so much skilled labor as in the U. S. A.?

One man from Studebaker said, "We can take a farm boy, and in about six weeks make him an operator of a machine." I question that statement—he would be lucky if he could read mikes in that time.

There is one point I think has been overlooked in this Defense program by all concerned, and bringing it to light is something you and MOTOR AGE can do.

The average personnel of all automobile repair shops is made up of men with machine shop training and long experience in motor repairing. These men would make excellent supervisors of motor production. All the skilled mechanics are not to be found only in factories, but out in the field, and there are millions of them



Wiring Diagram, Oldsmobile, 1941

men who yesterday, today and tomorrow are responsible for keeping the mechanized forces of the United States moving—and who are doing an excellent job. They are trained to that job.

I would be willing to give up my shop and serve Uncle Sam by giving him the benefit of my skill and experience, and I am sure there are a great many mechanics who feel as I do. (I am way past the draft age, so don't think this offer is just to provide an "out.") Why not recruit from the ranks of professionals for the important job of building for National Defense, instead of conscripting green help? If you want to make speed you have to have men who already know, and don't have to be trained.

Why not give some space in your MOTOR AGE to this problem? Ask the repair field how many would be willing to quit their present employment to serve Uncle Sam in a like capacity. The beginners could step into the shoes of the men leaving their jobs, thereby making work for more men, and we would be on an even, efficient basis.—Cliff Oppel, Duluth, Minn.

FIXING HOLES IN THE GAS TANK

We have solved the gas tank soldering problem.

When we get a car with a small hole in the gas tank caused by a rock having been thrown up against it, we don't attempt to solder it. We enlarge the hole slightly to get a smooth edge to the metal and a good round hole, and then cut a small lead washer about 1/16 in. thick. We run a self-tapping screw through the center of the lead washer and into the hole in the gas tank. If it is a small hole and the tank metal is strong, you can run the screw in tight enough to make the lead washer act as a seal, and it will stop the leak. If the hole is large, and the tank metal is thin so that you can't put much pressure on the screw without buckling the tank, we give the underside of the lead washer a coating of sealing compound.

We have used this method quite often, and have had very good success.—*Bill Hurlery, Campus Service Station Garage, Corvallis, Oregon.*

"Don't talk to me about it—it's my boss's idea!"

CLEANING TESTERS

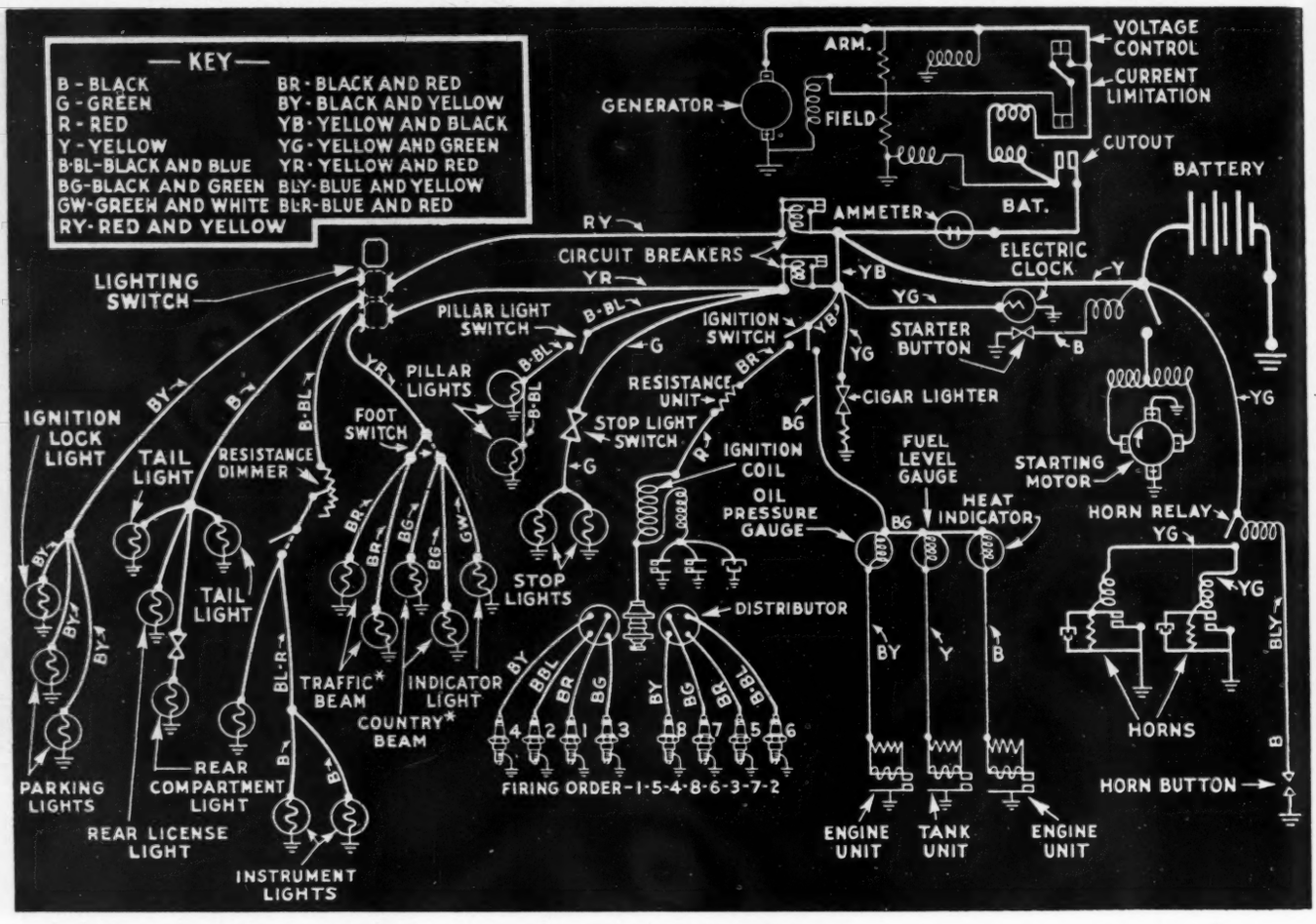
When your anti-freeze tester gets cloudy so that it is hard to read the figures, simply fill the tester part full with paint thinner, shake it a little, and empty it. You will find that it is as clean as a new tester.—*Ira W. Longstreet, Longstreet's Garage, Goodman, Mo.*

BENT ROD

Will appreciate a little help on a DeSoto 1936 S1 car. Have honed this block, installed new pistons, pins and rings, new bushings in rods, new rod inserts, ground valves, installed new timing chain.

This motor developed a knock after a short while, which could be shorted out on No. 1 cylinder. Took off head and pan again and removed rods and found No. 1 and 2 rods badly out of alignment. Realigned them again and same knock is showing up again.

These rod bushings were reamed on latest Sunnen machine and aligned on dial machine. Rod journals are not more than 0.001 taper or out of round. Rod seemed to kick sideways on pin when taken down after first job. Could it be possible these rods are distorting from heat? This motor runs perfectly except for this knock. Wm. Keckefoth Motor Company, 111-113 E. 2nd Street, Winona, Minn.



Wiring Diagram, 1941 Ford

I THINK you can pretty well dismiss the theory that these rods are distorting from heat. If the rods are becoming hot enough to distort from the heat, the connecting rod bearing wouldn't stay with you very long. I am more inclined to two other possible causes: first, these connecting rods were not properly aligned in the first place, or second, the connecting rod bearing journal on the crankshaft is not true.

By the first point of not being aligned correctly, I mean that when you placed the rods on the jib and found that they were out of line, you may have brought them back into alignment and then stopped. The usual procedure is to go a little bit beyond the proper point and then come back to it rather than bring the rod up to the point of proper alignment and then leave it. If you simply bring the rod up to proper alignment and then leave it, it is almost certain to go back to its original misaligned shape when it enters service.

Your statement that the rods seem to "kick" sideways on the pin leads me to wonder whether you mean that there is a perceptible movement of the piston pin end of the rod as the engine is turned over slowly. This point should be checked pretty carefully because if there is a movement of the connecting rod lengthwise on the piston pin as the engine is turned over slowly, it is a pretty clear indication that the connecting rod bearing journal on the crankshaft is not true in its horizontal plane. This would mean that the crankshaft would have to be trued up with a crankshaft regrinding tool and in order to be sure that it is true in its horizontal plane, probably the best method of doing this job would be to remove the crankshaft from the engine and true it up in a lathe.

"Either I get the brakes fixed or take that ornament off front. I'm getting too many tickets lately!"

Of course, it is expensive for you to be continually tearing down this engine to align connecting rods, but it is even more expensive to pull the shaft out of the engine. My first suggestion, therefore, is that you check the piston pin ends of the connecting rods for endwise motion on the pin very carefully while the engine is being turned over slowly. This should be done when you are sure that the connecting rod has been properly aligned. If you find that the piston pin end of the rod does not travel lengthwise on the piston pin then it would indicate to me that the connecting rod has been bent so much in the aligning processes that it is no longer serviceable and then I would install a new rod. If, on the other hand, the pin end does move lengthwise on the piston pin when you are sure the rod is in proper alignment, there is nothing else for you to do except to attempt to true up the crankshaft.

Tips on Painting

We are trying our hand at fender work, and we are running into a few difficulties with the painting, so we thought you may be able to help us.

When the filler is applied, is a special cloth used to wipe it even? What is the operation when painting over the filler?

Is there a manual on spraying, or other information, that I could secure? —Tom Maher, 1030 Morris Place, Bronx, New York City.

EXCEPT when the surface is very rough, the primer-filler coat is sprayed on with a gun and no wiping is necessary. When the surface is rough or has dents, then a filler of a putty type is applied with a putty knife. This is made as smooth as possible with a putty knife and then sprayed with a primer.

The Chilton Company has a manual on body and frame work which includes a chapter on spray painting. In addition, there are dimensional diagrams of passenger car frames covering 1938, 1939 and 1940 models. There are also service instructions on welding, frame straightening, fender repairing, glass renewal, and how to remove and replace body hardware. The price of this manual is $4.00.

Use a Torque Wrench

I am confronted with an unusual trouble in connection with an overhaul on a 1937 Studebaker Dictator.

I have installed new rings, ground valves and cleaned carbon, installed new points, cap, rotor and condenser, and new spark plugs, with new gaskets all around.

The pistons were sent to a jobber who Koetherized them, that is five of them—one new piston was needed as the old one was damaged in attempting to install a skirt expander. The new piston was standard size and the jobber said he would expand it to the same dimensions as the others.

When this engine is started when cold it runs fine for a few minutes, and then a knocking noise similar to a burned rod sets in. This noise gets worse and finally the engine will stop with a grunt. If the engine is allowed to stand for a few minutes it can be started again, and again runs quietly for a short time when the noise sets in again. The speed of the engine makes no difference.

The oil pressure runs about 40 lbs. at medium idle, with S.A.E. 20 oil. Rod bearings seemed to be in good shape, and pressure was O. K. previous to tearing down the engine, so I did not replace them. The jobber reassembled the pistons on the rods and tested the alinement of the rods.

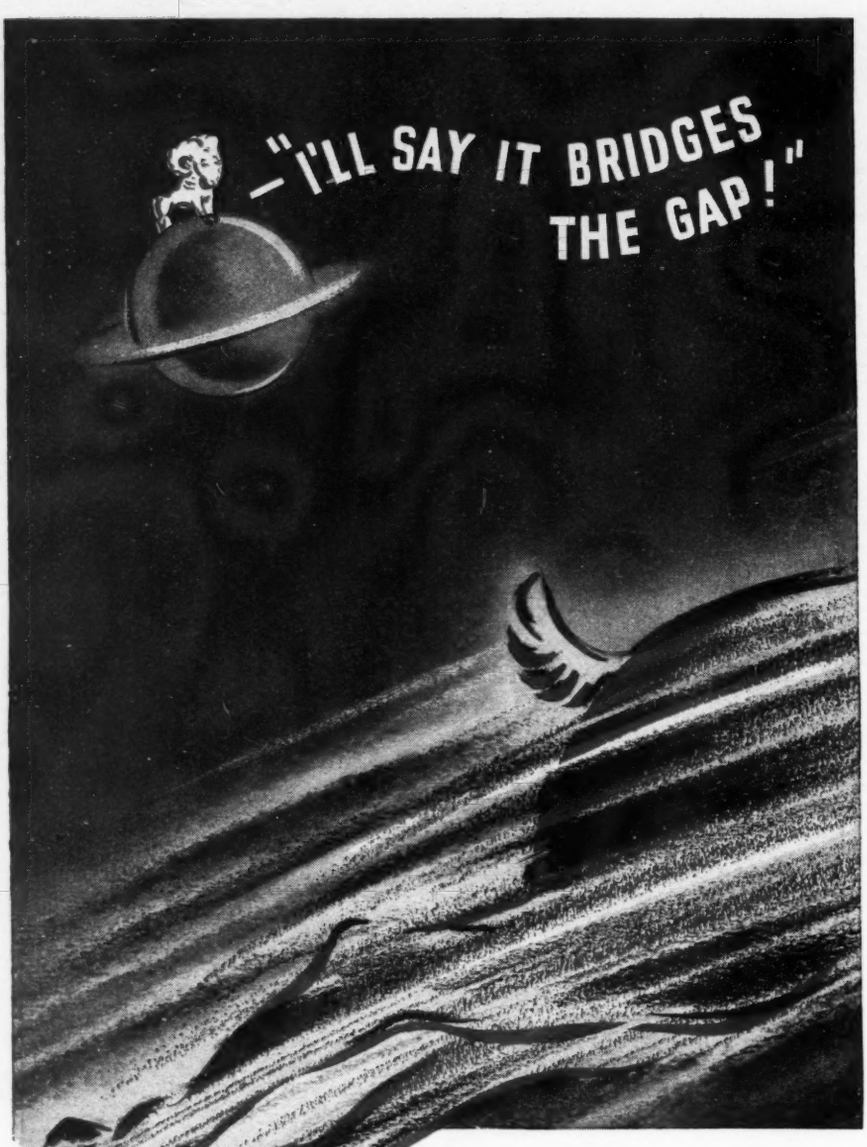
My diagnosis of the trouble would be that the new piston is a little too tight, and as soon as it gets hot it creates so much friction that it tends to seize. The resistance of the piston weight causes a knock from a rod that normally would be tight enough.

Do you think a dose of break-in oil would relieve this condition until the engine gets run in, or will it be necessary to tear the engine down again and turn down that piston?— J. N. Lyndall, Wyoming, Del.

I THINK that your diagnosis of the trouble you are experiencing with that 1937 Studebaker Dictator is correct. In other words, probably the new piston or some of the old ones which have been expanded, have insufficient clearance. I would suggest that you try some break-in oil such as you suggested, but before doing that I would get a torque wrench and go over the rod and main bearings, pulling them up to their proper tension and also pull the cylinder head down to the proper tension.

My reason for this is that when the bolts are pulled down in the ordinary manner it invariably results in distortion of the cylinder block. This, in turn, results in undue friction and in extreme cases a knock will result.

Replace it with a New Departure . . .
the same bearing that competent engineers choose for the majority of original installations.
UNITED SERVICE MOTORS
Authorized replacement bearing service wherever you see this sign. Authentic records—complete stocks—sudden service.
NEW DEPARTURE
THE FORGED STEEL BEARING



Controls

You've got to be concerned with controlling blow-by as well as oil pumping if you want to make your ring jobs the talk of the town! For blow-by control is essential to long piston ring life and efficiency.

In Ramco 10-Up you have a ring combination that *does not* rely on blow-by to aid in oil control . . . you have a ring combination with 7* blow-by controlling surfaces

*3 Ring Piston

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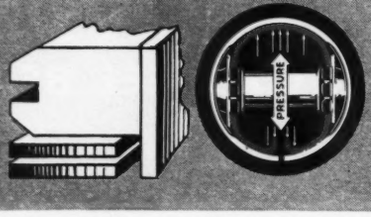
RAMCO DOUBLE LIFE PRINCIPLE

insures a cushion of cast-iron on cylinder wall . . . the inner ring spring tension is on the cast-iron segment . . . not the steel!



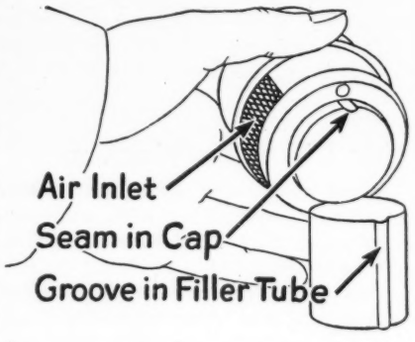
RAMCO PISTON EXPANDERS

exert pressure only against the thrust sides . . . the only sides that need expansion! For all pistons including Ford Steel and Chevrolet cast-iron pistons.

Service FROM THE

Excessive Oil Consumption

If you should have a case of excessive oil consumption with a 1940 Pontiac car, check the installation of the oil filter cap. Pontiac advises that cases have been reported in which this cap was found to have been installed backwards, permitting the fan blast to actually draw oil vapors out of the filler pipe.



The cap should be installed with the opening in the cap *toward the fan.* There is a seam in the cap, and this seam should line up with the groove in the filler tube.

High Compression Heads

Cast iron cylinder heads having a compression ratio of 7 to 1, as compared to the standard ratio of 6.5 to 1, are available for the 1941 Studebaker cars under the following part numbers:

Champion, Part No. 513815
Commander, Part No. 513899
President, Part No. 513814

It is pointed out by the manufacturer that high compression heads are not recommended except for use in altitudes of 5,000 feet or more.

Cleaning Upholstery Leather

Leather upholstery used on current sport models of Chevrolet should not be cleaned with polishes or other cleaning preparations. When it is desired to clean this upholstery, water and a Castile soap should be used.

Hints

FACTORIES

Apply a damp (not wet) cloth to soap and rub the surface of the leather briskly. Next, apply a moist cloth without soap. Finish by rubbing dry with a clean soft cloth. The gloss, which will appear to be removed by the washing, will be restored by friction produced by the dry cloth.

Drag Link Installation

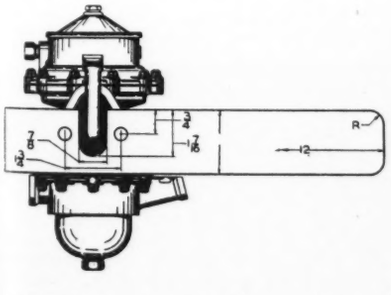
The steering connecting rod or drag link on Cab-Over-Engine models of Chevrolet should be installed with the offset for the Pitman arm toward the front of the job with the lubrication fitting on top. This installation is exactly the opposite of the drag link installation on the conventional 1½-ton trucks.

If the drag link is not properly installed, the lubrication fitting may cut the tire badly when turning to the right.

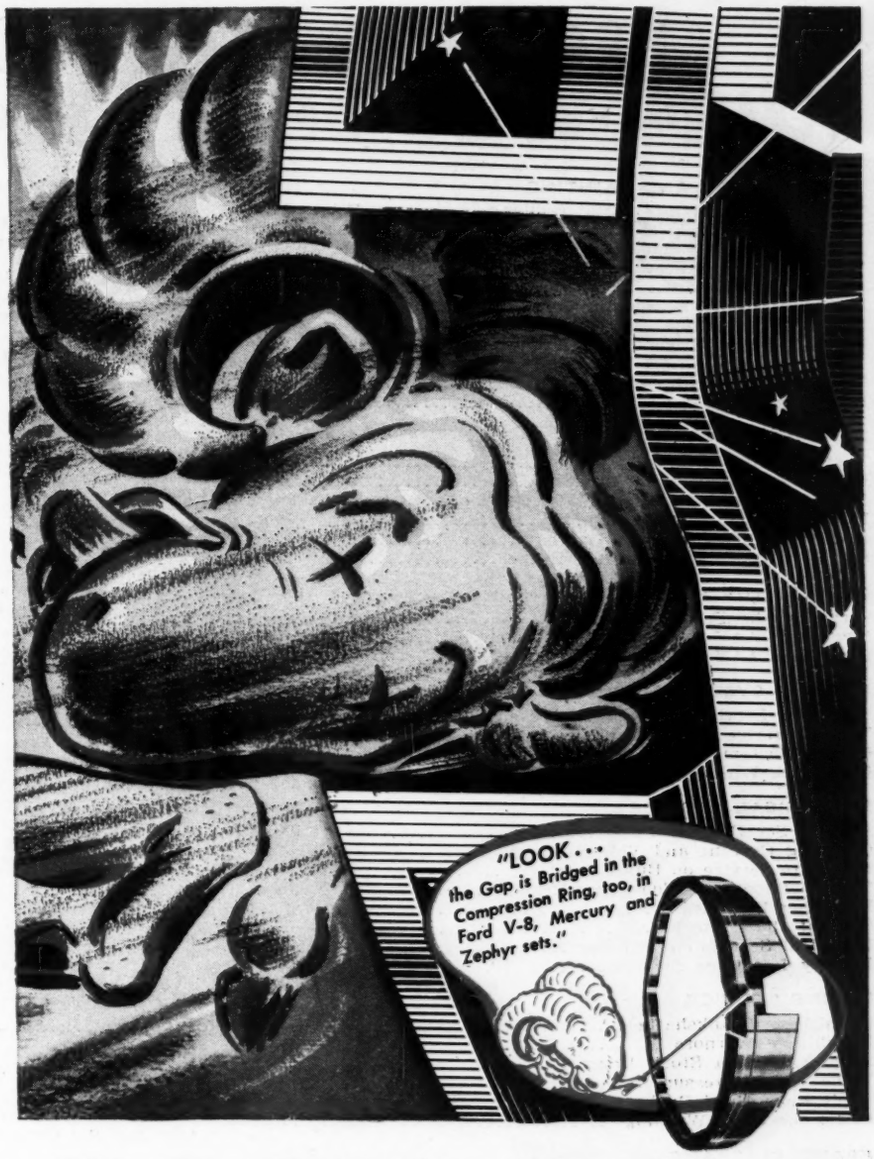
Pump Holding Fixture

From the Pontiac Motor Company comes a suggestion for making a holding fixture to simplify work on fuel pumps.

As illustrated, the fixture is made of a bar of cold rolled stock, ⅜ in. x 2 in. x 12 in. long. A slot ⅞ in. wide and 1 7/16 in. deep is cut in the bar for the fuel pump operating arm; two holes, drilled and tapped for a ⅜ in. cap screw are located on each side of the slot, ¾ in. down from the top and 1¾ in. from centers.



The fuel pump is fastened to the bar by the cap screws, and the long end of the bar is clamped in a vise.



BLOW-BY!

bearing on the cylinder wall . . . plus two Spiro-Seal segments which bridge the gap. No wonder Ramco 10-Up is guaranteed to control both oil and blow-by for 10,000 miles with a warranty that covers both the rings and installation labor. Next time . . . say Ramco 10-Up.

Ramsey Accessories Mfg. Corp., 3711 Forest Park Blvd., St. Louis, Mo. *Canadian Address:* 144 Front St. W., Toronto, Ont.

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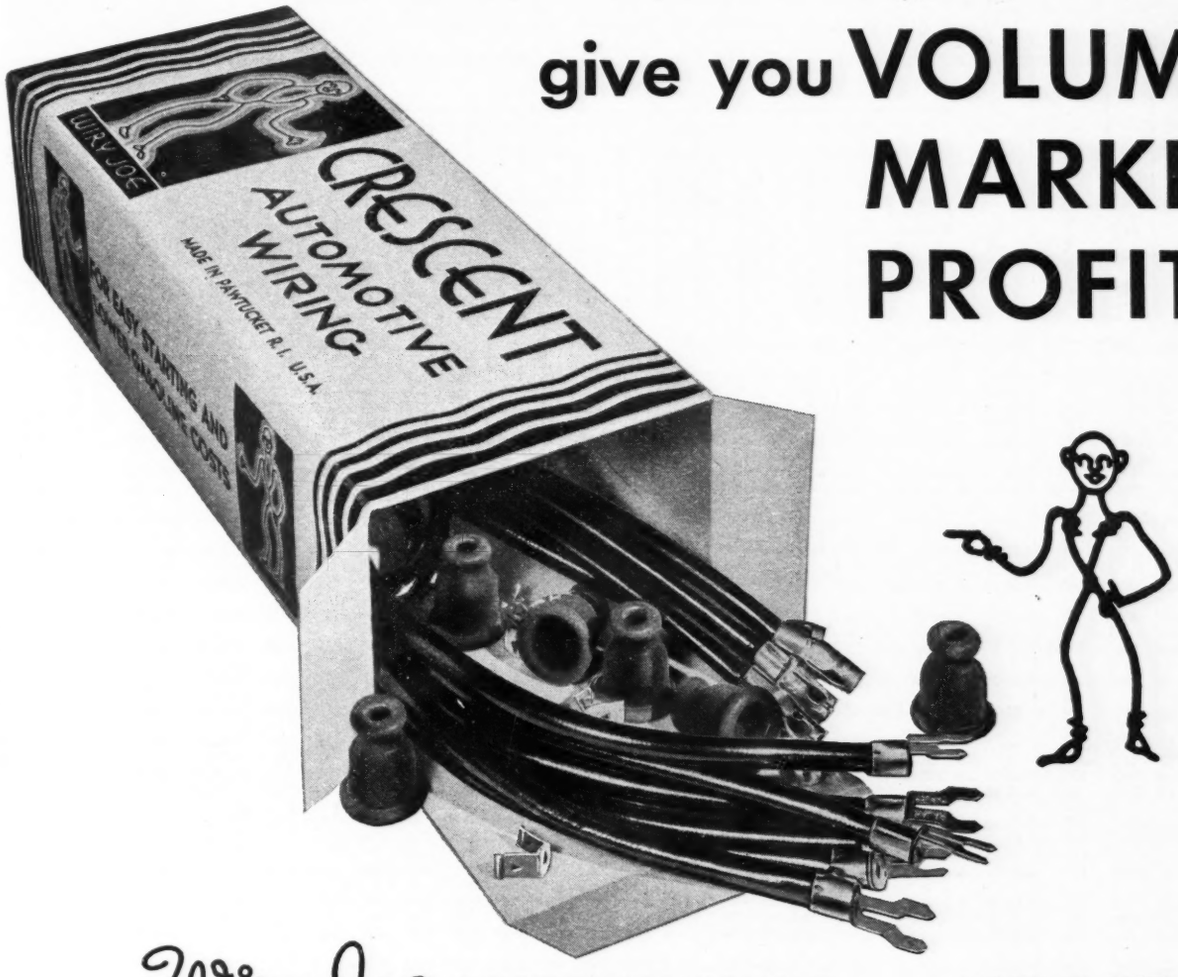
HIGH QUALITY and LOW PRICE give you VOLUME MARKET PROFITS



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Today—longer profits are the only answer to the increased cost of doing business . . . The Wiry Joe line of automotive wiring gives you top quality and low prices to build up your sales volume—and an extra discount so you can show a real net profit.

Wiry Joe—made by the biggest independent in the industry—guarantees the highest quality . . . and the Dostam method of manufacture results in prices that are substantially lower than those of equally high quality.

You owe it to your profits to take advantage of this big opportunity for increased sales . . . Highest quality ignition cable is available in spools, or in sets complete with spark plug terminals, rubber rain protectors and distributor terminals . . . Attractive deals . . . Call your jobber today.

Wiry Joe AUTOMOTIVE WIRING
PRODUCED BY THE
DOSTAM METHOD
BY THE
CRESCENT CO. - Pawtucket, R. I., U. S. A. - Montreal, Canada

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Lowest priced 4-D. Sed. (Delvd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE: No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake Hp. at Specified R.P.M.	Compression Ratio (to—1)	Displacement Factor †	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	CHASSIS: Clutch Type and Make	Universal Joint Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension
Bantam.....65	449	75	4.00/15	4-2.26x3.12	8.2	50.14	22-3800	7.40	....	CI	Own	Al	None	AC	Z	Mc	AL	AL	P-Ro	UP	½ Spi	5.25	Tr
Buick.....41-40	1052	121	6.50/16	8-3 3/32x4 1/8	30.6	248.0	115-3500	6.50	36.4	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obl	Mp-S-S	½ Own	4.40	IC
Buick.....41-50	1185	121	6.50/16	8-3 3/32x4 1/8	30.6	248.0	125-3800	7.00	33.6	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obl	Mp-S-S	½ Own	4.10	IC
Buick.....41-60	1288	126	7.00/15	8-3 1/16x4 1/16	37.8	320.2	165-3800	7.00	39.0	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obl	Mp-S	½ Own	3.90	IC
Buick.....41-70	1364	126	7.00/15	8-3 1/16x4 1/16	37.8	320.2	165-3800	7.00	39.1	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obl	Mp-S	½ Own	3.90	IC
Buick.....41-90	2155	139	7.50/16	8-3 1/16x4 1/16	37.8	320.2	165-3800	7.00	....	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obl	Mp-S	½ Own	4.18	IC
Cadillac V8..61,62,63,60S	1445	126	7.00/15	8-3 1/2x4 1/2	39.2	346.0	150-3400	7.25	....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	½ Own	3.77	IC
Cadillac V8.....67, 75	2595	139-136	7.50/16	8-3 1/2x4 1/2	39.2	346.0	150-3400	7.25	....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	½ Own	4.27	IC
Chevrolet.M.DL & Sp.DL	795	116	6.00/16	6-3 1/2x3 3/4	29.4	216.5	90-3300	6.50	35.2	CI	Dia	CI	None	AC	Car	Var	DR	DR	P-Own	Nb-Own	½ Own	4.11	IC
Chrysler.....C-28	1051	121½	6.25/16	6-3 5/16x4 1/2	27.3	241.5	112-3600	6.80	35.1	CI°	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	½	3.90	IC
Chrysler...C-30N, C-30K	1278	127½	7.00/15	8-3 1/4x4 7/8	33.8	323.5	137-3400	6.80	41.5	CI°	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	½	3.91	IC
Chrysler.....C-33	2595	145½	7.50/15	8-3 1/4x4 7/8	33.8	323.5	140-3400	6.80	....	Al	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	½	4.55	IC
Crosley.....CB-41	366	80	4.25/12	2-3x2½	7.2	35.3	12-4000	5.60	....	CI	Wau	CI	None	AC	Til	Own	AL	AL	P-Ro	Mp-S	½ Spi	5.14	C
De Soto-DeL. & Cust..S-8	995	121½	6.25/16	6-3 5/16x4 1/4	27.3	228.1	105-3600	6.80	35.5	CI°	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	½	4.10	IC
Dodge-DeL. & Cust..D-19	920	119½	6.00/16	6-3 1/4x4 3/8	25.3	217.8	91-3800	6.50	....	CI	Mor	Al	Pur	AC	Str	.....	AL	AL	P-B&B	bt	½	4.30	IC
Ford-DeL. & Sup. DeL..85	740‡	114	6.00/16	8-3.062x3.75	30.0	221.0	85-3800	6.15	....	CI	Dia	CS	.....	....	Own	Own	Own	Own	P-Long	Own	¾ Own	3.78	Tr
Hudson-DeL. & Tr. 6..10	811	116	(d)	6-3x4 1/8	21.6	175.0	92-4000	7.25	34.8	CI	Dia	Al	None	AC	Car	Old	AL	Na	P-Own	NB-Spi	½ Own	4.55	IC
Hud.-Sup.& Com. 6..11,12	952	121	(f)	6-3x5	21.6	212.0	102-4000	6.50	35.4	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	½ Own	4.11	IC
Hudson-Com'dore 8...14	1085	121	6.25/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	39.6	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	½ Own	4.11	IC
Hudson-Comm. Cus. 8..17	1278	128	6.50/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	....	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	½ Own	4.11	IC
Lincoln-Zeph.&Cont. V-12	1450‡	125	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	....	CI	Dia	CS	.....	.....	Own	Own	Own	Own	P-Long	Own	¾ Own	4.44	Tr
Lincoln-Custom.....V-12	2550‡	138	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	....	CI	Dia	CS	.....	.....	Own	Own	Own	Own	P-Long	Own	¾ Own	4.44	Tr
Mercury.....95	960‡	118	6.50/16	8-3.187x3.75	32.5	239.0	95-3600	6.15	....	CI	Dia	CS	.....	.....	Own	Own	Own	Own	P-Long	Own	¾ Own	3.54	Tr
Nash-Amb. 600.....4140	780	112	5.50/16	6-3 1/8x3 3/4	23.4	172.6	75-3600	6.87	33.4	CI	W-D	Als	None	AC	Car	Wal	DR	AL	P-B&B	m-Mec	½ Own	4.11	IC
Nash-Amb. 6.....4160	930	121	6.25/16	6-3 3/8x4 3/8	27.3	234.8	105-3400	6.30	35.6	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	½ Own	4.10	IC
Nash-Amb. 8.....4180	1050	121	6.50/16	8-3 1/8x4 1/4	31.2	260.8	115-3400	6.30	38.2	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	½ Own	4.10	IC
Oldsmobile.....Special 6	945	119	6.00/16	6-3 1/2x4 1/8	29.4	238.0	100-3400	6.20	37.7	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.10	IC
Oldsmobile....Dynamic 6	1010	125	6.50/16	6-3 1/2x4 1/8	29.4	238.0	100-3400	6.20	37.2	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.30	IC
Oldsmobile.....Custom 6	1099	125	7.00/15	6-3 1/2x4 1/8	29.4	238.0	100-3400	6.20	37.0	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.30	IC
Oldsmobile.....Special 8	987	119	6.00/16	8-3 1/4x3 7/8	33.8	257.0	110-3600	6.30	38.4	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.10	IC
Oldsmobile....Dynamic 8	1045	125	6.50/16	8-3 1/4x3 7/8	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.30	IC
Oldsmobile.....Custom 8	1135	125	7.00/15	8-3 1/4x3 7/8	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	½ Own	4.30	IC
Packard-110.....1900	1056	122	6.50/16	6-3 1/2x4 1/4	29.4	245.0	100-3600	6.39	....	CI	Mor	Als	.....	AC	Str	.....	A-D	Wil	P-Long	UP	½ Own	4.30	IC
Packard-120.....1901	1261	127	7.00/15	8-3 1/4x4 1/4	33.8	282.0	120-3600	6.41	40.6	CI	Mor	Als	.....	AC	Car	Wal	AL	AL	P-Long	rb-Mec	½ Own	4.09	IC
Packard-160....1903, 4, 5	1750	127-38-48	7.00/16	8-3 1/2x4 5/8	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	½ Own	(g)	IC
Packard-180....1906, 7, 8	2587	127-38-48	7.00/16	8-3 1/2x4 5/8	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	½ Own	(g)	IC
Plymouth.....P-11	780	117	6.00/16	6-3 1/16x4 3/8	23.4	201.3	87-3800	6.70	35.1	CI	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	½ Own	4.10	IC
Plymouth-Spec. DeL.P-12	840	117	6.00/16	6-3 1/16x4 3/8	23.4	201.3	87-3800	6.70	36.1	CI°	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	½ Own	4.30	IC
Pontiac-DeL. 6.....41-25	921	119	6.00/16	6-3 3/16x4	30.4	239.2	90-3200	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.10	IC
Pontiac-Stream. 6...41-26	980	122	6.50/16	6-3 3/16x4	30.4	239.2	90-3200	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.30	IC
Pontiac-Custom 6...41-24	1052	122	6.50/16	6-3 3/16x4	30.4	239.2	90-3200	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.30	IC
Pontiac-DeL. 8.....41-27	946	119	6.00/16	8-3 1/4x3 3/4	33.8	248.9	103-3500	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.10	IC
Pontiac-Stream. 8...41-28	1005	122	6.50/16	8-3 1/4x3 3/4	33.8	248.9	103-3500	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.30	IC
Pontiac-Custom 8...41-29	1077	122	6.50/16	8-3 1/4x3 3/4	33.8	248.9	103-3500	6.50	....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	½ Own	4.30	IC
Studebaker-Champ. 6..3G	770	110	5.50/16	6-3x4	21.6	169.6	80-4000	6.50	39.2	CI	Dia	Al	None	AC	Car	Wal	AL	Wil	P-B&B	NB-Spi	½ Spi	4.56	IT
Studebaker-Com. 6...11A	985	119	6.25/16	6-3 3/8x4 3/8	26.3	226.2	94-3600	6.50	40.2	CI	Dia	Al	Fram	AC	Str	Wal	AL	Wil	P-B&B	NB-Spi	½ Spi	4.55	IT
Studebaker-Pres. 8....7C	1115	124½	7.00/16	8-3 1/16x4 1/4	30.0	250.4	117-4000	6.50	39.0	CI	Dia	Al	Fram	AC	Str	Wal	AL	Wil	P-Inl	NB-Spi	½ Spi	4.55	IT
Willys-Americar.....441	705	104	5.50/16	4-3 1/16x4 3/8	15.6	134.2	63-3900	6.48	30.8	CI	LB	Al	None	AC	Car	Mc	AL	AL	P-At	m-UP	½ Own	4.44	½ E

ABBREVIATIONS:

½—Semi-floating
¾—Three-quarter floating
½-E—Semi-elliptic
°—Aluminum optional
‡—Exclusive of Federal taxes.
(d)—De Luxe, 6.00/16; Traveler, 5.50/16
(f)—Model 11—6.00/16; Model 12—6.25/16
(g)—Models 1903-6, 3.92; Models 1904-7, 4.09; Models 1905-8, 4.36

A-D—Electric Auto-Lite Co. and Delco-Remy Division
AC—AC Spark Plug Co.
Al—Aluminum
AL—Electric Auto-Lite Co.
Als—Aluminum with struts
At—Atwood
B&B—Borg & Beck Division
bt—Ball and trunnion type
C—Conventional
Car—Carter Carburetor Corp.
CC—Conventional coil
CI—Cast iron
CN—Chrome nickel
CS—Cast steel
Dia—Continental Diamond Fibre Co.
DR—Delco-Remy Division
Hay—Hayes Industries, Inc.
IC—Independent coil spring
Inl—Inland with Long disc
IT—Independent transverse
LB—Link Belt Co.
Long—Long Mfg. Div.
m—Metal with anti-friction bearings.
Mc—MacKenzie Muffler Co.
Mec—Mechanics Universal Joint Division
Mor—Morse Chain Co.
Mp—Metal with plain bearings
M-W—Morse or Whitney
Na—National Battery Co.
Nb—Needle bearing
Obl—Own clutch, Borg & Beck or Long disc
Old—Oldberg Mfg. Co.
P—Single plate clutch
Pur—Purolator Products, Inc.
rb—Roller bearing
Ro—Rockford Drilling Machine Div.
S—Saginaw Steering Gear Div.
S-C—Stromberg and Carter
SM—Saginaw and Mechanics
Spi—Spicer Mfg. Corp.
S-S—Saginaw and Spicer
Str—Stromberg (Bendix Products Div.)
Til—Tillotson Mfg. Co.
Tr—Transverse
Un—United Air Cleaner Div.
UP—Universal Products Co.
Var—Various
Wal—Walker Mfg. Co.
Wau—Waukesha Motor Co.
W-D—Whitney and Diamond Chain Co.
Whit—Whitney Mfg. Co.
Wil—Willard Storage Battery Co
Z—Zenith Carburetor Div.

Tune-Up Specifications

These Specifications Are Brought Up-to-Date Each Month by the Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Compression Pressure at Cranking Speed (Lbs.)	Spark Plugs: Make and Type	RINGS: No. and Width Compression	RINGS: No. and Width Oil	VALVES: Inlet Seat Angle (Degrees)	VALVES: Exhaust Seat Angle (Degrees)	VALVES: Stem Diameter (Ins.)	VALVES: Operating Tappet Clearance: Inlet	VALVES: Operating Tappet Clearance: Exhaust	VALVES: Inlet Tappet Clearance for Valve Timing	VALVES: Inlet Valve Opens Before or After T. C.: No. of Degrees	VALVES: Inlet Valve Opens Before or After T. C.: No. of Flywheel Teeth	IGNITION: Breaker Points Gap (Ins.)	IGNITION: Cam Angles (Degrees)	IGNITION: Spark Plug Gap (Ins.)	IGNITION: Timing: Spark Occurs °TC	IGNITION: Timing: No. of Flyw. Teeth Spark Occurs TC	IGNITION: Timing: Timing Marks Located	Rods Removed From	Capacity Crankcase (Qts.) Dry	Capacity Cooling System	FRONT AXLE: Caster (Degrees)	FRONT AXLE: Camber (Degrees)	FRONT AXLE: Toe-In (Inches)	FRONT AXLE: King Pin Inclination (Degrees)
Bantam.....65	135	Ch-H10	2–3/32	1–1/8	45	45	.279	.011H	.012H	.011	19B	4¼B	.022	46	.025	4B	1B	None	A	3	5½	15	1°–15′	1/8	1½
Buick.....41-40	142(x)	AC-104	2–3/32	2–3/16	45	45	.372	.015H	.015H	††	13B	5¼B	.015	31	.025	2B	1B	None	A	8	13	3/8±3/8	N1/8+1 1/8	0–1/16	3½
Buick.....41-50	148x	AC-104	2–3/32	2–3/16	45	45	.372	.015H	.015H	††	13B	5¼B	.015	31	.025	4B	1B	None	A	8	13	3/8±3/8	N1/8+1 1/8	0–1/16	3½
Buick.....41-60	151x	AC-104	2–3/32	2–3/16	45	45	.372	.015H	.015H	††	14B	6B	.015	31	.025	6B	2½B	None	A	10	16¾	3/8±3/8	N1/8+1 1/8	0–1/16	3½
Buick.....41-70	151x	AC-104	2–3/32	2–3/16	45	45	.372	.015H	.015H	††	14B	6B	.015	31	.025	6B	2½B	None	A	10	16¾	3/8±3/8	N1/8+1 1/8	0–1/16	3½
Buick.....41-90	151x	AC-104	2–3/32	2–3/16	45	45	.372	.015H	.015H	††	14B	6B	.015	31	.025	6B	2½B	None	A	10	18	3/8±3/8	N1/8+1 1/8	0–1/16	4¾
Cadillac V8..61,62,63,60S	182x	AC-104	2–(c)	2–3/32	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-1°-N2 3/32	-3/32+3/32	1/32–3/32	5°–51′
Cadillac V8.....67, 75	182x	AC-104	2–(c)	2–3/32	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-1½-N2 1/4	-3/8+3/8	3/32–3/32	5°–51′
Chevrolet. Sp.DL & M.DL	....	AC-104	2–1/8	1–3/16	30	30	.340	.006H	.013H	.006	3B	1B	.018	39	.040	5B	2B	Fly	A	5½	14	0–+½	N¼±½	0–1/16	4°–45′
Chrysler.....C-28	145x	AL-A7	2–1/8	2–3/32	45	45	.340	.008H	.010H	.014	12B	4¾B	.020	34½–38	.025	....	TC	VD	A	5	18	N1–+1	0–+¾	0–1/8	4¾–6
Chrysler...C-30N, C-30K	155x	AL-A7	2–1/8	2–3/32	45	45	.340	.008H	.010H	.011	6B	2½B	.018	27–30½	.025	TC	TC	VD	A	6	24	N1–+1	0–+¾	0–1/8	4¾–6
Chrysler.....C-33	155x	AL-AL7	2–1/8	2–3/32	45	45	.340	.008H	.010H	.011	6B	2½B	.018	27–30½	.025	3B	1B	VD	A	6	24	N1–+1	0–+¾	0–1/8	4¾–6
Crosley.....CB-41	80	AL-A5	2–1/8	1–3/32	45	45	.311	.006C	.008C	....	20B	5B	.020	46	.025	TC	TC	Fly	A	3	....	6½–11	2	1/16	6½
De Soto-Del. & Cust. .S-8	150x	AL-A7	2–1/8	2–3/32	45	45	.340	.008H	.010H	.014	12B	2½B	.020	34½–38	.025	TC	TC	VD	A	5	18	N1–+1	0–+¾	0–1/8	4¾–6
Dodge-DeL. & Cust..D-19	142x	AL-A7	2–(c)	2–3/32	45	45	.340	.008H	.010H	.014	9B	3½B	.020	34½–38	.025	TC	TC	VD	A	5	15	N1–+1	0–+¾	0–1/8	4¾–6
Ford-DeL. & Sup. DeL..85	100	Ch-H10	2–(b)	1–(f)	45	45	(k)	.011C	.011C	....	TC	TC	.015	.....	.025	4B	1¼B	Dist	A	5	23¾	4½–9	¼–1	1/16	8
Hudson-DeL. & Tr. 6..10	125x	Ch-J9	2–3/32	2–(d)	45	45	.341	.006H	.008H	....	10⅔B	4B	.020	34	.032	½"B	2½B	Fly	A	6	13	0±¼	½±¼	1/32±1/32	3°36′
Hud.-Sup.& Com. 6..11,12	120x	Ch-J9	2–3/32	2–(d)	45	45	.341	.006H	.008H	....	10⅔B	4B	.020	34	.032	½"B	2½B	Fly	A	6	13	0±¼	½±¼	1/32±1/32	3°36′
Hudson-Com'dore 8...14	119x	Ch-J9	2–3/32	2–(d)	45	45	.343	.006H	.008H	....	10⅔B	4B	.017	30½	.032	TC	1B	Fly	A	9	18	0±¼	½±¼	1/32±1/32	3°36′
Hudson-Comm. Cus. 8..17	119x	Ch-J9	2–3/32	2–(d)	45	45	.343	.006H	.008H	....	10⅔B	4B	.017	30½	.032	TC	1B	Fly	A	9	18	0±¼	½±¼	1/32±1/32	3°36′
Lincoln-Zeph.& Cont. V-12	....	Ch-H10	2–(g)	1–(h)	45	45	.311	.013C	.013C	....	10⅔B	3¼B	.015	.....	.029	4B	1¼B	Dist	A	5	22	3–5	¼–¾	1/16	3¾–4¾
Lincoln-Custom.....V-12	....	Ch-H10	2–(g)	1–(h)	45	45	.311	.013C	.013C	....	10⅔B	3¼B	.015	.....	.029	4B	1¼B	Dist	A	5	22	3–5	¼–¾	1/16	3¾–4¾
Mercury.....95	100	Ch-H10	2–(b)	1–(f)	45	45	(k)	.011C	.011C	....	TC	TC	.015	.....	.025	4B	1¼B	Dist	A	5	23¾	4½–9	¼–1	1/16	8
Nash-Amb. 600.....4140	120	AL-AN7	2–3/32	1–3/16	45	45	.341	.015	.015	.019	6B	2B	.018	35	.025	TC	TC	VD	A	5	14	0	0–½	0–1/16	5½
Nash-Amb. 6.....4160	125	AC-	2–1/8	2–3/32	45	45	.372	.015	.015	.015	24B	6B	.020	35	.023	...	.....	VD	A	6	17	0–N½	¼–¾	1/32–3/32	4½
Nash-Amb. 8.....4180	110	AC-	2–1/8	2–(e)	45	45	.372	.015	.015	.015	19B	6B	.020	28	.023	9B	2¾B	VD	A	7	16	0–N½	¼–¾	1/32–3/32	4½
Oldsmobile.....Special 6	115	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Oldsmobile....Dynamic 6	115	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Oldsmobile.....Custom 6	115	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Oldsmobile.....Special 8	107	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	¾B	Fly	A	6	22	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Oldsmobile....Dynamic 8	107	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	¾B	Fly	A	6	22	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Oldsmobile.....Custom 8	107	AC-44	2–3/32	2–3/16	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	¾B	Fly	A	6	22	0–N¾	N¼–¾	1/16–1/8	4°51⅙′
Packard-110.....1900	....	(a)	2–(m)	1–3/16	30	45	.339	.007H	.010H	.012	1B	½B	.020	35	.028	6B	2½B	VD	A	5	15	½±½	½+¾–0	0+1/16–0	2½
Packard-120.....1901	....	(a)	2–(n)	1–1/16	30	45	.339	.007H	.010H	.012	1B	½B	.015	27	.028	7B	2¾B	VD	A	6	17	½±½	½+¾–0	0+1/16–0	2½
Packard-160....1903, 4, 5	....	(a)	2–(m)	1–3/16	30	45	.339	aa	11	aa	4B	1½B	.015	27	.028	5B	2B	VD	A	7	20	N¾±½	½+¾–0	0+1/16–0	2½
Packard-180....1906, 7, 8	....	(a)	2–(m)	1–3/16	30	45	.339	aa	aa	aa	4B	1½B	.015	27	.028	5B	2B	VD	A	7	20	N¾±½	½+¾–0	0+1/16–0	2½
Plymouth.....P-11	....	AL-A7	2–(c)	2–3/32	45	45	.340	.008H	.010H	.014	9B	3½B	.020	34½–38	.025	TC	TC	VD	A	5	14	N1–+1	0–¾	0–1/4	4¾–6
Plymouth-Spec. DeL.P-12	....	AL-A7	2–(c)	2–3/32	45	45	.340	.008H	.010H	.014	9B	3½B	.020	34½–38	.025	TC	TC	VD	A	5	14	N1–+1	0–¾	0–1/8	4¾–6
Pontiac-DeL. 6.....41-25	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1½B	Fly	A	6	18	N½–N1	0	0–1/16	4⅝
Pontiac-Stream. 6..41-26	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1½B	Fly	A	6	18	N½–N1	0	0–1/16	4⅝
Pontiac-Custom 6...41-24	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1½B	Fly	A	6	18	N½–N1	0	0–1/16	4⅝
Pontiac-DeL. 8.....41-27	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1½B	Fly	A	6	19½	N½–N1	0	0–1/16	4⅝
Pontiac-Stream. 8...41-28	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1½B	Fly	A	6	19½	N½–N1	0	0–1/16	4⅝
Pontiac-Custom 8...41-29	155x	AC-45	2–3/32	1–3/16	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1½B	Fly	A	6	19½	N½–N1	0	0–1/16	4⅝
Studebaker-Champ. 6..3G	105	Ch-J8	2–(c)	1–5/32	45	45	.312	.016C	.016C	.020	15B	5B	.020	35	.025	1B	2B	Fly	A	5	10½	1–2	½	1/8–7/32	5½
Studebaker-Com. 6...11A	105	Ch-8	2–3/32	1–3/16	45	45	.343	.016C	.016C	.020	15B	5½B	.020	35	.025	2B	¾B	VD	A	6	13	N1–+1	½	1/8–3/32	5½
Studebaker-Pres. 8....7C	105	Ch-8	2–1/8	1–3/16	45	45	.343	.016C	.016C	.020	15B	5½B	.020	34½	.025	TC	TC	VD	A	8	15	N1–+1	½	1/8–3/32	5½
Willys-Americar.....441	111	Ch-J9	2–3/32	1–3/16	45	45	.373	.014C	.014C	.020	9B	2½B	.020	41	.030	TC	TC	Fly	A	4	11¾	3	2	1/32–5/32	7½

ABBREVIATIONS:

(x)—At 1000
(a)—AC-104; Champion Y-4
(b)—.0915 to .0920 in.
(c)—3/32; 1/8
(d)—1 5/32; 1 3/16
(e)—1⅛; 1 3/16
(f)—.1535 in. to .1540 in.
(g)—.0930 in. to .0935 in.
(h)—.1845 in. to .1850 in.
(k)—.3095 in. to .3115 in.
(m)—1—.0932; 1—.1237
(n)—1—.0925—.0935; 1—.1235—.1240
aa—Automatic adjustment
A—Above
AA—Automatic Adjuster
AC—AC Spark Plug Co.
AL—Electric Auto-Lite Co.
C—Cold
Ch—Champion Spark Plug Co.
Dist—Distributor
Fly—On flywheel
H—Hot
N—Negative
TC—Top center
TD—Timing disc
VD—Vibration damper

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln-Zephyr, Mercury and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM		
Mast. Coupe, 2p.	449	1271
Mast. Road., 2p.	449	1211
Pickup Truck	475	1256
Panel Truck	489	1331
Conv. Coupe, 2p.	525	.....
Conv. Sedan, 4p.	549	1296
Sta. Wagon, 4p.	575	1411
BUICK		
Special 41-40		
Tour. Sedan, 4d.	1052	3730
Tr. Sed., SE., 4d.	1134	3790
Bus. Coupe	925	3630
Sedanet, 2d.	1006	3700
Sedanet, SE, 2d.	1063	3690
Estate Wagon	1360	3913
De Luxe Special 41-40		
Tour. Sedan, 4d.	1096	3730
Tr. Sed., SE., 4d.	1178	3790
Bus. Coupe	979	3630
Sedanet, 2d.	1050	3700
Sedanet, SE., 2d.	1107	3690
Estate Wagon	1366	3913
Super 41-50		
Bus. Coupe	1031	3670
Sport Coupe	1113	3670
Tour. Sedan, 4d.	1185	3770
Conv. Coupe	1267	3810
Conv. Phae., 4d.	1555	4014
Century 60		
Bus. Coupe	1195	3870
Sedan, 2d	1241	3920
Tour. Sedan, 4d.	1288	4025
Roadmaster 41-70		
Sport Coupe	1282	3920
Tour. Sedan, 4d.	1364	4010
Conv. Coupe	1457	4045
Conv. Phae., 4d.	1775	4269
Limited 41-90		
Tour. Sedan, 6p.	2155	4575
Tour. Sedan, 8p.	2360	4680
Limousine	2465	4760
Formal Sed., 6p.	2310	.....
CADILLAC		
Series 61		
Coupe, 5 p.	1345	3985
DeL. Coupe, 5p.	1435	4005
Tour. Sedan, 5p.	1445	4065
DeL. Tour. Sed.	1535	4085
Series 62		
Coupe, 2-4p	1420	3950
Tour. Sedan	1495	4030
DeL. Cpe., 2-4p.	1510	3970
DeL. Tr. Sed.	1585	4050
DeL. Conv. Cpe.	1645	4055
DeL. Conv. Sed.	1965	4230
Series 63		
Tour. Sedan, 5p.	1695	4110
Series 60S		
Tour. Dedan, 5p.	2195	4230
Tr. Sed. Div., 5p.	2345	4290
Series 67		
Tour. Sedan, 5p.	2595	4555
Tour. Sedan, 7p.	2735	4630
Tr. Sed. Div., 5p	2745	4630
Tr. Imperial, 7p.	2890	4705
Series 75		
Bus. Sedan, 9p.	2895	4738
Tour. Sedan, 5p.	2995	4750
Bus. Imperial, 9p	3050	4767
Tour. Sedan, 7p.	3140	4800
Tr. Sed. Div., 5p	3150	4810
Tr. Imperial, 7p.	3285	4860
Formal Sedan, 5p	3920	4915
CHEVROLET		
Master DeL.		
Bus. Coupe	712	3020
Coupe, 5p	743	3025
Town Sedan, 5p.	754	3050
Sport Sedan, 5p.	795	3090
Special DeL.		
Bus. Coupe	769	3040
Coupe, 5p	800	3050
Town Sedan, 5p.	810	3095
Sport Sedan, 5p.	851	3125
Cabriolet, 5p.	949	3285
Stat. Wagon, 8p.	995	.....
CHRYSLER		
Royal		
Coupe, 3p.	945	3205
Brougham, 6p.	1021	3305
Sedan, 4d., 6p.	1051	3350
Town Sedan, 6p.	1111	.....
Club Coupe, 5p.	1041	3295
Sedan, 7p.	1325	.....
Limousine, 7p.	1400	.....
Windsor		
Coupe, 3p.	998	3205
Sedan, 2d., 6p.	1075	3305
Sedan, 4d., 6p.	1125	3355
Club Coupe, 5p.	1096	3292
Town Sedan, 6p.	1175	3350
Conv. Coupe	1275	3575
Sedan, 7p	1395	3770
Limousine, 7p.	1410	.....
Saratoga C-30-N		
Coupe, 3p.	1195	3670
Brougham, 6p.	1248	3780
Sedan, 4d., 6p.	1278	3790
Town Sedan, 6p.	1328	3835
Club Coupe, 5p.	1268	3755
New Yorker, C-30-K		
Coupe, 3p.	1275	3670
Brougham, 6p.	1325	3780
Sedan, 4d., 6p.	1345	3805
Club Coupe, 5p.	1335	3760
Town Sedan	1375	3835
Conv. Coupe	1495	3980
Spec. Twn. Sed.	1745	3900
Crown Imp. C-33		
Sedan	2595	.....
Sedan, 8p.	2695	.....
Limousine	2795	.....
CROSLEY		
Coupe, 2p.	315	950
Std. Sedan, 4p.	366	975
DeL. Sedan, 4p.	376	975
Pkw. Delivery	390	1030
Pick. Delivery	400	1100
Cov. Wag., 2p.	402	1075
Cov. Wag., 4p.	417	1100
Panel Delivery	451	1100
Sta. Wag., 2p.	454	1135
Sta. Wag., 4p.	470	1160
DE SOTO		
De Luxe		
Coupe, 3p.	898	3134
Sedan, 2d., 3p.	965	3224
Sedan, 4d., 6p.	995	3254
Sedan, 7p	.....	.....
Club Coupe, 5p.	985	3219
Custom		
Coupe, 3p.	945	3144
C. Clb. Cpe., 5p	1195	.....
Brougham, 6p.	1020	3264
Sedan, 4d., 6p.	1045	3269
Town Sedan, 6p.	1095	3329
Club Coupe, 5p.	1035	3239
Sedan, 7p	1295	.....
Limousine, 7p.	1370	.....
DODGE		
DeLuxe		
Coupe	825	3028
Sedan, 2d., 6p.	880	3093
Sedan, 4d., 6p.	920	3155
Custom		
Broug., 2d., 6p.	925	3156
Club Coupe, 6p.	960	3156
Sedan, 2d., 6p.	965	3191
Town Sedan, 6p.	995	3226
Sedan, 7p	1175	3200
Limousine, 7p.	1250	3585
FORD		
Special		
Bus. Coupe	670	2764
Tudor Sedan	700	2869
Fordor Sedan	740	2919
DeLuxe—85		
Coupe, w.r.s.	695	2953
Coupe, f.s.	725	2931
Todor Sedan	735	3095
Fordor Sedan	775	3121
Station Wagon	920	3412
Super DeLuxe—85		
Coupe, w.f.s.	740	2969
Coupe, f.s.	770	3001
Tudor Sedan	780	3110
Fordor Sedan	820	3146
Sedan Coupe	810	3052
Conv. Club Cpe.	905	3073
Station Wagon	970	3419
HUDSON		
Traveler—10		
Coupe, 3p.	713	2790
Sedan, 2d., 6p.	783	2850
Club Coupe, 6p.	806	2840
Sedan, 4d., 6p.	811	2900
DeLuxe—10		
Coupe, 3p.	821	2840
Sedan, 2d., 6p.	842	2900
Club Coupe, 6p.	868	2895
Sedan, 4d., 6p.	876	2950
Convertible, 6p.	1083	2980
Super Six—11		
Coupe, 3p.	901	2935
Sedan, 2d., 6p.	921	3000
Club Coupe, 6p.	956	2980
Sedan, 4d., 6p.	952	3050
Convertible, 6p.	1175	3125
Commodore Six—12		
Coupe, 3p.	931	3000
Sedan, 2d., 6p.	1012	3050
Club Coupe, 6p.	1043	3045
Sedan, 4d., 6p.	1040	3100
Convertible	1247	3160
Commodore 8—14		
Coupe, 3p.	1024	3135
Sedan, 2d., 6p.	1049	3210
Club Coupe, 6p.	1086	3210
Sedan, 4d., 6p.	1085	3260
Convertible, 6p.	1297	3350
Commodore Cust. 8—15		
Coupe, 3p.	1110	3185
Club Coupe, 6p.	1173	3235
Commodore Cust. 8—17		
Sedan, 4d., 6p.	1278	3400
Sedan, 4d., 8p.	.....	3440
Big Boy—18		
Carryall, 8p.	.....	3165
Sedan, 8p.	.....	3155
LINCOLN-ZEPHYR Standard		
Coupe, 3p.	1390	.....
Sedan, 6p.	1450	.....
Club Coupe, 6p.	1450	.....
Conv. Coupe, 6p	1750	.....
Custom		
Coupe	1465	.....
Sedan	1545	.....
Club Coupe	1545	.....
LINCOLN-CONTINENTAL		
Cabriolet, 6p.	2700	.....
Coupe, 6p.	2650	.....
LINCOLN-CUSTOM		
Sedan, 8p.	2550	.....
Limousine, 8p.	2675	.....
MERCURY		
Coupe, w.f.s.	885	3008
Coupe, f.s.	910	3049
Sedan, 2d.	920	3184
Town Sedan	960	3221
Sedan Coupe	950	3118
Club, Conv.	1070	.....
Station Wagon	1110	3468
NASH		
Ambassador Special 600		
Business Coupe	731	.....
Sedan, 4d	780	.....
DeLuxe 600		
Business Coupe	783	.....
Brougham, 2d.	810	.....
Sed., DeL., 4d.	810	2630
Sedan, trk., 4d.	860	2655
Ambassador 6		
Business Coupe	923	3180
Sed., Spl., 4d.	930	3300
Brougham, 2d.	973	3235
Sed., DeL., 4d.	980	3300
Sedan, trk., 4d.	1030	3300
Ambassador 8		
Sed., Spl., 4d.	1051	3465
Brougham, 2d.	1081	3400
Sed., DeL., 4d.	1101	3455
Sedan, trk., 4d.	1151	3475
OLDSMOBILE Special Six		
Bus. Coupe, 3p.	852	3145
Club Coupe, 3-6p	893	3185
Sedan, 2d., 6p.	898	3190
Sedar, 4d., 6p.	945	3230
Conv. Cpe., 3-6p	1048	.....
Station Wagon	1104	.....
Dynamic Six		
Club Sedan, 6p.	954	3325
Sedan, 4d., 6p.	1010	3390
Custom Six		
Club Coupe, 3-6p	1043	3320
Sedan, 4d., 6p.	1099	3410
Conv. Cpe., 3-6p	1191	3525
Special Eight		
Club Coupe, 3-6p	935	3300
Sedan, 4d., 6p.	987	3360
Conv. Cpe., 3-6p	1089	3455
Dynamic Eight		
Club Sedan, 6p.	989	3420
Sedan, 4d., 6p.	1045	3500
Custom Eight		
Club Coupe, 3-6p	1079	3430
Sedan, 4d, 6p.	1135	3500
Conv. Cpe., 3-6p	1227	3620
Conv. Phae., 6p.	1575	3790
PACKARD One Ten		
Bus. Coupe, 2p.	907	3150
Club Cpe., 2-4p.	1000	3200
Tr. Sed., 2d., 5p.	1024	3245
D. Cb. Cpe., 2-4p	1038	3205
Tr. Sed., 4d., 5p.	1056	3250
D. T. Sd., 2d., 5p	1084	3270
D. T. Sd., 4d , 5p	1116	3270
Conv. Cpe., 2-4p	1175	3310
D. C. Cpe., 2-4p.	1209	3315
Stat. Wag., 8p.	1231	3460
D. Sta. Wag., 8p	1306	3470
One Twenty		
Bus. Cpe., 2p.	1112	3385
Club Cpe., 2-4p.	1205	3430
Tr. Sed., 2d., 5p.	1230	3504
Tr. Sed., 4d., 5p.	1261	3510
Conv. Cpe., 2-4p	1377	3585
Sta. Wagon, 8p.	1436	3720
D. Sta. Wag., 8p	1511	3730
Conv. Sedan, 5p.	1723	3725
Super Eight One Sixty—1903		
Bus. Coupe, 2p.	1594	3875
Club Cuupe, 2-4p	1709	3800
Tr. Sed., 4d., 5p	1750	3865
Conve. Cpe. 2-4p	1892	3965
D. C. Cpe., 2-4p.	2067	3985
Conv. Sedan, 5p.	2180	4140
D. Conv. Sed., 5p	2405	4160
1904		
Tr. Sed., 4d., 5p	2009	4305
1905		
Tour. Sedan, 7p.	2161	4495
Limousine	2289	4570
One Eighty—1906		
Conv. Vict., 5p.	4550	4040
1907		
Tr. Sed., 4d., 5p.	2587	4350
Formal Sed., 5p.	3045	4380
Brougham, 5p.	3500	4450
Cabriolet	4650	4075
Sport Sedan, 5p.	4750	4490
1908		
Tour. Sedan, 7p.	2724	4590
Tr. Lim., 7p.	2868	4650
Town Car	4775	4200
Tr. Sd., LeB., 7p	5300	4740
Tr. Lim., LeB., 7p	5550	4850
PLYMOUTH		
Coupe, 2p.	685	2809
Sedan, 2d., 5p.	739	2859
Sedan, 4d., 5p.	780	2889
Utility Sed., 2d.	739	2794
DeLuxe		
Coupe, 2p.	729	2839
Sedan, 2d., 5p.	779	2899
Sedan, 4d., 5p.	820	2924
Special DeL.		
Coupe, 2p.	760	2859
Coupe, 2-4p.	805	2934
Sedan, 2d., 5p.	810	2934
Sedan, 4d., 5p.	840	2959
Conv. Cpe., 2-4p	970	3166
Sedan, 7p	1045	3379
Limousine, 7p.	1120	.....
Station Wagon	995	3194
PONTIAC		
DeLuxe Six		
Coupe	828	3145
Sedan Coupe	864	3180
Sedan, 2d	874	3190
Sedan, 4d	921	3235
Conv. Sed. Cpe.	1023	3335
PONTIAC (Continued)		
Streamliner Six		
Sedan Coupe	923	3305
Sedan, 4d	980	3365
Sup. Sed. Cpe.	969	3320
Sup. Sed., 4d	1026	3400
Custom Six		
Sedan Coupe	995	3260
Sedan, 4d	1052	3355
DeL. Eight		
Coupe	853	3220
Sedan Coupe	889	3250
Sedan, 2d	899	3250
Sedan, 4d	946	3285
Conv. Sed. Cpe.	1048	3390
Streamliner Eight		
Sedan Coupe	948	3370
Sedan, 4d	1005	3425
Sup. Sed. Cpe.	994	3385
Sup. Sed., 4d	1051	3460
Custom Eight		
Sedan Coupe	1020	3325
Sedan, 4d	1077	3430
STUDEBAKER		
Champion Custom		
Coupe	690	2355
Coupe, 5p	725	2375
Club Sedan	730	2420
Cruis. Sedan	770	2450
DeLuxe		
Coupe	720	2365
Coupe, 5p	755	2385
Club Sedan	760	2430
Cruis. Sedan	800	2460
DeLux-Tone		
Coupe	755	2380
Coupe, 5p	790	2400
Club Sedan	795	2445
Cruis. Sedan	835	2475
Commander 6 Custom		
Cruis. Sedan	985	3135
Land Cruiser	1030	3160
DeLux-Tone		
Cruis. Sedan	1050	3155
Land Cruiser	1095	3180
President 8 Custom		
Cruis. Sedan	1115	3390
Land Cruiser	1160	3420
DeLux-Tone		
Cruis. Sedan	1180	3405
Land Cruiser	1225	3435
WILLYS-AMERICAR		
Coupe	.....	.....
Sedan	705	2265
Station Wagon	.....	.....

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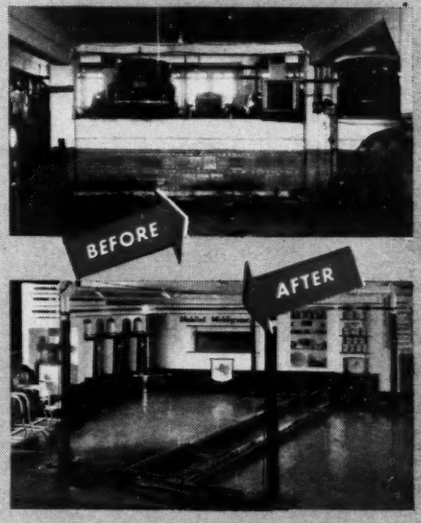
TO CAR DEALERS AND SERVICE GARAGES:

Lube Jobs Jumped 71% 1st Month!

REPORTS CHARLES E. BROKAW, GEN. MGR., CULLEN-THOMPSON MOTOR CO., DENVER, COLORADO



JUST ONE MONTH'S business proved how right Cullen-Thompson Motor Co. was in adopting Socony-Vacuum's Modern Service Methods.

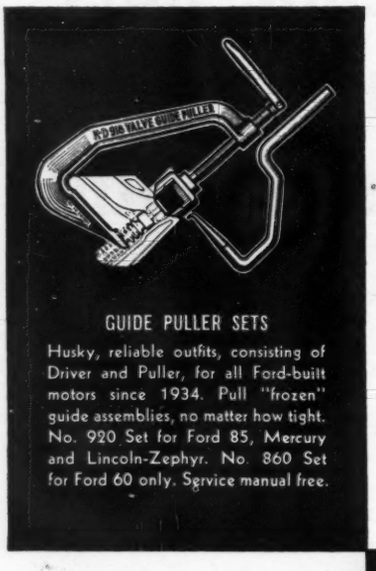
That first month—lube jobs were 71% better than the same month a year before . . . job ticket average was up 24% . . . labor sales advanced 28% . . . and repair jobs showed a neat increase, too!

ADDRESS CAR DEALER DIVISION—SOCONY-VACUUM OIL CO., INC., 26 BROADWAY, N. Y. C.

Socony-Vacuum

MAKERS OF MOBILOIL AND MOBILGREASE

SALES MEETING This picture taken during the sales meeting of the Raybestos division of Raybestos-Manhattan, Inc., in Chicago, shows, l. to r., S. E. Shepherd, merchandising and sales promotion manager, R. B. Davis, general manager, and Norman Leeds, Jr., replacement sales manager.



GUIDE PULLER SETS

Husky, reliable outfits, consisting of Driver and Puller, for all Ford-built motors since 1934. Pull "frozen" guide assemblies, no matter how tight. No. 920 Set for Ford 85, Mercury and Lincoln-Zephyr. No. 860 Set for Ford 60 only. Service manual free.

Tools

THAT EARN THEIR KEEP

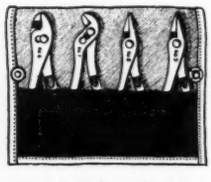
NO. 600 VALVE LIFTER

For nearly all L-head motors. An old established favorite in thousands of shops. Adjustable, tempered jaws, parallel acting.

K-D Tools are made by automobile mechanics, for automobile mechanics. Each one is designed to do a particular job . . . to do it easily . . . to do it quickly. The K-D Catalog is full of time and labor savers, the result of twenty years progressive designing and producing special hand tools for the automotive trade. There are a few (but only a few) shown here. Send for the complete catalog today and convince yourself that K-D Tools can save YOU real money on every job.

NO. 380 COMPRESSOR

Fast and strong, services nearly all L-head and valve-in-head motors. Two pairs tempered adjustable jaws, straight and offset. 10" x 10¼" inside clearance.

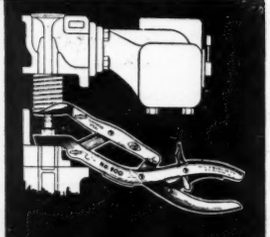


NO. 10K PLIERS KIT

Those 4 popular K-D Pliers in a NEW roll Kit to fit the pocket. Just right for all small work in hard-to-reach places. Each 4¼" long with milled jaws and knurled handles. Tempered.

NO. 605 KEEPER INSERTER

For nearly all split keepers. Easy loading, self supporting on valve stem. Ideal for use with 600 and 380, see above.



NO. 900 LIFTER

For fast under-fender use. 8¾" long, 3" parallel lift. Tempered jaws. Auxiliary jaws for extra high lift.

K-D MANUFACTURING CO.

Lancaster, Pa., U. S. A.

Canadian Factory

HAMILTON, ONTARIO

Ask Your Jobber for Net Prices

M.E.M.A. Reports Makers Shipments Ahead of 1939

In the report issued in December, reporting on October, 1940 business, Motor and Equipment Manufacturers Assn. points out that manufacturers reporting their monthly business figures showed shipments in original equipment, accessories and service equipment all advanced for October over the previous month. Service parts shipments declined only one point, but all were above October 1939 indices.

The Grand Index for all branches of the industry rose to 190 per cent of the January 1925 base as compared with 178 per cent for September and 146 per cent for October 1939.

Shipments to vehicle manufacturers for original equipment in October advanced to 235 per cent of the base, which compares with 185 per cent registered in September and 159 per cent for October, 1939.

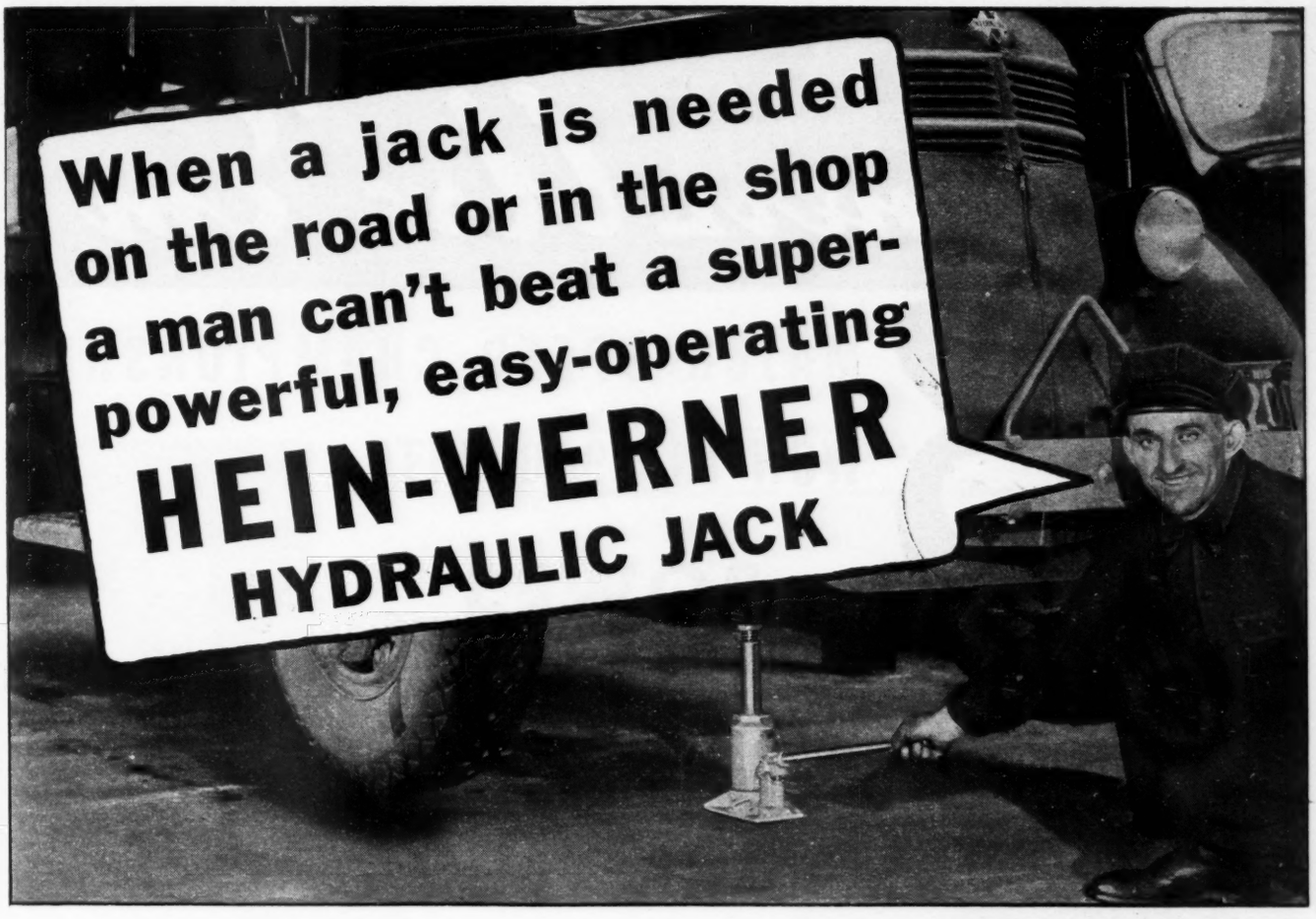
Service parts shipments to wholesalers for October declined to 199 per cent of the base as compared to 200 per cent in September. In October, 1939 the index stood at 183 per cent.

Accessories shipments to wholesalers in October increased, standing at 149 per cent of the base index, which compares with 132 per cent in September and 106 per cent in October 1939.

Service equipment shipments to wholesalers in October advanced to 142 per cent of the base, which compares with 139 per cent in September and 101 per cent in October 1939.

DuPont Further Increases Neoprene Plant Capacity

E. I. du Pont de Nemours & Co. has started construction on a further addition to its neoprene plant at Deepwater, N. J. The new section is expected to be completed by October, 1941, and will be equivalent in size to an addition just completed. Together, the new facilities will give the company a capacity of 1,500,000 lb. per month, nearly six times the capacity available in the summer of 1939.



West Coast prices are slightly higher than those shown above

STOCK and FEATURE H-W HYDRAULIC JACKS . . . You will be surprised how easy and profitable it is to sell these jacks to owners of cars and trucks . . . . .

Very few new cars or trucks are factory equipped with hydraulic jacks, and it will pay you to call this fact to the attention of your customers. A demonstration of a Hein-Werner Hydraulic Jack requires but a few minutes, and is very convincing. Try it, and you'll be amazed how many jacks you can sell if you make demonstrations and ASK 'EM TO BUY.

Hein-Werner makes an outstanding line of hydraulic jacks, and a small stock will enable you to supply the correct jack for any car or truck.

The complete H-W line includes 1½, 2, 3, 5, 8, 12 and 20 ton capacity under-the-axle type jacks, four models of Bumper-Lift Hydraulic Jacks for passenger cars, and a full line of Service Jacks of 1¼, 1½, 2, 3 and 4 tons capacity.

For details and latest prices, ask your H-W jobber, or write us

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

HEIN-WERNER hydraulic JACKS

Winners Use 'Em

MAJOR SPEED CHAMPIONSHIPS WON IN 1940 WITH

BOWES SEAL FAST SPARK PLUGS

● These champions are all "old hands" at the game. Each has been in top flight competition for a number of years and each one realizes the importance of perfect spark plug equipment.

They know that regardless of how well built their motors may be it's "no soap" if the spark plugs they elect to use fail to perform perfectly.

These winners selected Bowes Spark Plugs because they knew as a result of exhaustive tests that Bowes Spark Plugs are . . .

THE PLUGS THAT CAN TAKE IT

It is apparent their judgment was pretty fair . . . they won the 3 major speed championships in 1940 using Bowes "Seal-Fast" Spark Plugs.

● **REX MAYS,** using Bowes Spark Plugs, won 100-mile races at Springfield, Illinois, and Syracuse, N. Y., and placed 2nd at Indianapolis 500-Mile Race which gave him the coveted AAA Championship for 1940.

● **JIMMY WILBURN,** Dirt Track Champ, using Bowes Spark Plugs, won the Central States Racing Ass'n Championship in '38, '39, and '40, and the International Motor Contest Ass'n crown in 1940.

● **CLAYTON BISHOP,** using Bowes Spark Plugs, won spectacular Albany-to-New York Hudson River outboard motorboat race in '39 and '40.

YOU CAN WIN WITH BOWES SPARK PLUGS

You'll never be undersold on Bowes Spark Plugs . . . you won't suffer loss of good will by having your customers see Bowes Plugs priced elsewhere for considerably less than your price.

Along with our new tester and cleaner we have developed a special merchandising plan that is greatly increasing plug sales for our customers. Write for details if you want greater plug sales . . . greater plug profits.

BOWES "SEAL-FAST" CORPORATION, INDIANAPOLIS, INDIANA

AUTOMOTIVE MEN

Spangler Becomes V.-Pres.

J. M. Spangler

John M. Spangler, general sales manager of National Carbon Co., Inc., has been made a vice-president of the company, it has been announced by **Paul Huffard,** president of National Carbon and vice-president of Union Carbide and Carbon Corp.

Mr. Spangler joined the company in 1915. He became manager of the railroad department five years later and in 1923 was made head of the western sales division, with headquarters in Chicago. He became successively manager of the eastern division of National Carbon Company, with offices in New York, and assistant general sales manager. He took over the national sales management five years ago.

Name Manley Sales Manager

W. P. Ferris

W. P. Ferris was recently appointed sales manager of the Manley Manufacturing division of American Chain & Cable Co., Inc., with headquarters at York, Pa. He is well known in the automotive service industries as he served as sales and advertising manager of a large parts manufacturer from 1919 to 1925, and in the equipment field for the 12 years thereafter. He has also served both as Secretary and as a Director of Motor and Equipment Manufacturers' Association.

Earl G. Gunn recently became associated with Manley as consulting engineer in connection with the design and development of the Manley line of equipment for automotive service stations, repair shops and garages.

General Motors Appointments

C. E. Wilson, acting president of General Motors Corporation, today announced the following organization changes effective immediately:

B. D. Kunkle to be vice-president in charge of Personnel; **F. O. Tanner** to be vice-president in charge of Manufacturing; **W. C. Williams, Jr.** to be vice-president in charge of the Accessory Divisions.

L. C. Goad, general manager of the AC Spark Plug Division at Flint, Michigan, will be transferred to Detroit as assistant to Mr. Williams.

George Mann, Jr. who has been with General Motors for 21 years becomes general manager of the AC Spark Plug Division.

Alfred P. Sloan, Jr., chairman of General Motors, issued the following statement regarding action taken at the meeting of the Board of Directors this afternoon:

"**W. C. Williams, Jr., Frederick C. Kroeger** and **Edward F. Fisher** were elected vice-presidents of the Corporation, and Mr. Williams was elected a member of the Administration Committee of the Corporation.

"Mr. Williams is on the staff of C. E. Wilson, acting president, as assistant in charge of the manufacturing section, with offices in Detroit.

"Mr. Kroeger is general manager of the Allison Division of General Motors at Indianapolis, Ind., to which position he was named last August. Previously he had been general manager of the Delco-Remy Division.

"Mr. Fisher is general manager of the Fisher Body Division of General Motors, with headquarters in Detroit."

Here's

Action

—that
STOPS oil pumping!
PREVENTS carbon!
PROVIDES adequate cylinder lubrication!
MINIMIZES cylinder and ring wear!

Licensed under patent 2148997

Drān-Bac Oil Rings

DRAN-BAC oil rings are *living action!* From the moment installed the action of their multiple wiping edges in - and - out, up-and-down, provides constant GLOVE FIT flexibility which can be depended on to stop oil pumping and to lubricate the cylinder at all speeds. And it's this action, this flexibility which keeps the DRAN-BAC oil ring carbon-free and thereby long-lived!

Available in "H" Sets

"H" Sets too are dependable! Each ring engineered for its own special groove gives utmost compression and oil economy. Countless thousands installed without comeback.

Keep your shop out in front and in the money with DRAN-BAC oil rings. Insist on them in your Set requirements. Try our "H" Set. Send for sample and literature. JOBBERS: Get our proposition NOW!

THE WEL-EVER PISTON RING CO.,
Toledo, Ohio & Windsor, Ont.

WEL-EVER

TRADE MARK REGISTERED

M.E.W.A. Elections

At the Annual Convention of the Motor and Equipment Wholesalers Association, which was held December 6 and 7, in Chicago, **Thomas C. Tonkin**, Casper Supply Company, Casper, Wyoming, was elected president of the Association for the coming year. Mr. Tonkin succeeds Frank G. Stewart, Standard Automotive Supply Co., Washington, D. C., who was M.E.W.A. president during the past year.

Other officers chosen for the coming year are: **Robert J. Loock**, R. J. Loock & Company, Baltimore, Md., vice-president; **Henry J. Dinkmeyer**, Chicago Auto Parts, Inc., Chicago, Illinois, treasurer; and **C. Weir Hammond**, Motor Hdwe. & Equip. Co., San Diego, California, secretary.

Hansot Appointed

W. Hansot, for the last five years the advertising manager of Socony-Vacuum Oil Company in Paris, has joined the Aridye Corporation, Fair Lawn, N. J., in a merchandising capacity. Mr. Hansot served recently as an officer in the French Army. He was formerly associated with the Blackman Company advertising agency in New York.

Cars and trucks will be much busier this year—relatives and friends visiting loved ones in far-off camps, trucks rolling along with defense materials for teeming factories. It's "full speed ahead", with thousands of motorists making old cars do another year and other thousands buying new models. It all adds up to *more repair work with fewer men to do it!*

The answer is indelibly clear—in 1941, as never before, TOOLS WILL TELL! Plan now, with your Snap-on salesman, for tool equipment that will get more work done and let you have more fun doing it. The business to pay for it is here, plus handsome profits on extra jobs and the opportunities for advancement that always favor the well equipped man.

Super-Service Set
No. 488
Here's the set for complete service . . . with every basic tool for a wide range of operations on new and old cars and trucks.

Write for newest 96-page catalog. Over 550 Snap-on direct factory representatives in principal cities.

SNAP-ON TOOLS CORPORATION
Dept. MA-1 **Kenosha, Wisconsin**

Snap-on
SERVICE TOOLS
The Choice of Better Mechanics

Heads AC Spark Plug

George Mann, Jr.

Appointment of **George Mann, Jr.**, as head of the AC Spark Plug division of General Motors, is announced by C. E. Wilson, acting president of the Corporation. He succeeds **L. Clifford Goad**, who has been advanced to the position of assistant to the vice-president in charge of the Corporation's accessory divisions.

Mr. Mann was born in Baltimore, 52 years ago. He came to the AC company from E. I. duPont de Nemours on January 1, 1919, taking charge of AC's cost accounting department. In 1924 he was made assistant comptroller; in 1929 assistant to the president and latterly assistant secretary and director of industrial relations.

Named Willard G.M.

C. E. Murray

Claude E. Murray, veteran of 30 years' service with the Willard Storage Battery Co., has been appointed vice-president and general manager of the company's activities, it was announced last month.

Murray who, for the past 11 years, has been vice-president and general manager of the company's Canadian affiliate in Toronto, succeeds **S. W. Rolph** as general manager of the Willard organization, Rolph becoming vice-president of the Electric Storage Battery Co. of Philadelphia.

Smith Is Keystone President

Announcement is made by the Keystone Automobile Club of Philadelphia, Pa., that **J. Maxwell Smith**, for many years its secretary and general manager, has been elected president of the Club and its insurance companies, succeeding J. Borton Weeks, his life-long friend and associate, who died November 14.

Salute!
TO OLDSMOBILE DEALERS
1940
BIGGEST YEAR IN
OLDSMOBILE'S
43-YEAR HISTORY!
FROM THE DESK OF
D. E. RALSTON
I want to express my thanks personally, and on behalf of the entire executive staff of Oldsmobile, to each and every one of Oldsmobile's dealers and salesmen for the splendid selling job they did in 1940.
This loyal and hard-working organization delivered more cars at retail last year, by a substantial margin, than in any previous year in Oldsmobile's entire 43-year history.
With a 1941 line that has already proved its public appeal, and with sales momentum that is accelerating from month to month, you may look forward to even greater success in the year ahead.
Oldsmobile dealers, we salute you! May 1941 bring profits and prosperity to you all!
D. E. Ralston
General Sales Manager

Sets Up Finishes Division

Personnel and territory changes in the automotive finish department of the Sherwin-Williams Company Cleveland, Ohio, to create a separate division devoted exclusively to automotive finishes are announced by E. W. Windsor, general manager of the company's Automotive Division. The changes are effective immediately, and are said to be in line with the company's policy toward complete specialization in the automotive field and to assign only experienced men to automotive accounts.

Coincident with the new appointments is the setting up of three zones, each under the direction of a Zone Manager. G. E. Smith, with headquarters at the company's Philadelphia office, takes charge of the Eastern Zone which includes the New England and Atlantic coast states, while R. R. Owens will manage the North Central Zone, from his Cleveland office. The Southwest Zone includes the Mississippi Valley states. and is under the direction of R. C. Hall, whose office is in Little Rock, Arkansas.

"After I fix this flat—then may I give you the ticket?"

Other Personnel Changes

The resignation of **M. J. Golden,** for almost two years Sales Manager of Willys-Overland Motors, Inc., has just been announced by Joseph W. Frazer, president. His successor has not yet been appointed, and Mr. Golden has not announced his future plans.

* * *

E. J. Cremins, until recently district sales manager for Studebaker in the Newark, N. J., territory, has been promoted to the Business Merchandising Division, according to announcement by C. Scott Fletcher, sales manager of the Studebaker Corporation.

Mr. Cremins, an automobile sales veteran, will headquarter in New York City and cover three Studebaker branches namely; New York, Buffalo and Boston.

* * *

At a special meeting of the Board of Directors of General Motors Acceptance Corporation the following were elected directors: **Henry M. Hogan,** assistant general counsel, General Motors Corporation; and **James D. Deane, Nelson C. Dezendorf, Charles P. Fiske** and **Charles G. Stradella,** vice-presidents of G. M. A. C. With the election of these directors, the G. M. A. C. Board has been increased to 15 members.

* * *

Cliff S. Gerstang, recently promoted Promotional Sales Manager for Barrett Equipment Company, St. Louis, announces expansion of sales force. **Claude Huitt,** formerly sales engineer with Thermoid Rubber Company, is now divsion manager in charge of the Eastern District; **W. A. Nelson,** formerly service sales engineer for Rex-Hide, Inc. will supervise territory operations in Michigan, Indiana and Kentucky.

Thanks to the extra smoothness and durability of Link-Belt Roller Bearings!

Yes, sir! You can spread a lot of sunshine among your customers by replacing the worn bearings in their cars and trucks with Link-Belt Roller Bearings. And, they'll find that these better bearings will not only improve performance, but they'll stand-up far longer, even in the toughest service. The reason is the exclusive convex-concave roller principle on which these bearings are built. Ask your jobber to explain this to you—you'll see at a glance that it's a great advancement in bearing construction. Use Link-Belt Roller Bearings in your next job! 8398

LINK-BELT COMPANY
519 N. Holmes Ave., Indianapolis, Indiana
Warehouses in all principal trading centers

Made by the makers of the famous Silverstreak Silent Timing Chain!

THE PERFECT REPLACEMENT FOR FRONT WHEELS DIFFERENTIALS AND REAR AXLES

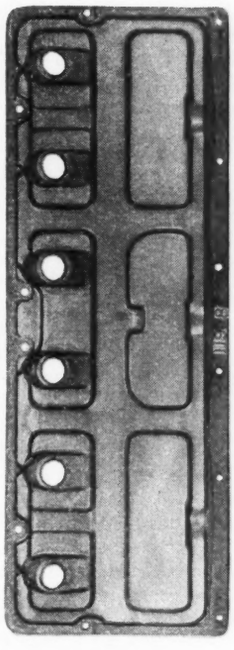
LINK-BELT SHAFER ROLLER BEARINGS

(Advertisement)

We Win Another Point With This

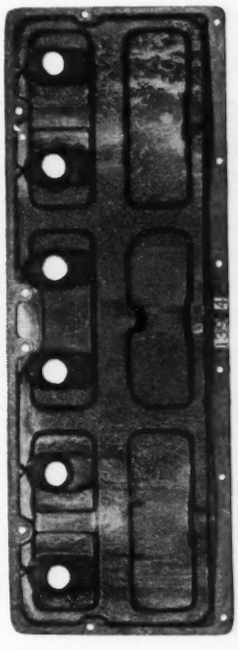
EVIDENCE UNDER COVER

These three unretouched photographs of push rod covers show the results of tests of three nationally sold, popular brands of motor oil.



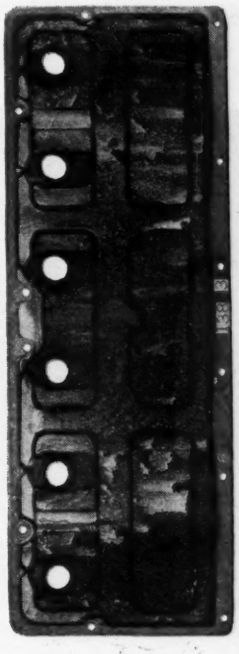
SLUDGE . . . TRACE

Stabilized Quaker State Motor Oil. After comparative test . . . push rod cover is almost spotlessly clean.



SLUDGE . . . HEAVY

30¢ motor oil. After comparative test . . . there is a heavy film of buttery sludge over surface of push rod cover.



SLUDGE . . . EXTRA HEAVY

25¢ motor oil. After comparative test . . . push rod cover is thickly covered with layer of hard granular sludge.

● Quaker State has developed a process that gets rid of the unstable elements in motor oil . . . those trouble-makers that cause nearly all the sludge, varnish and acid. Consequently, the New Stabilized Quaker State means a cleaner motor, a smooth-running motor, a well-protected motor . . . *and a satisfied motorist too.*

Try it yourself . . . in your own car. A motor expert appreciates better than anyone the improved performance and protection it gives. The longer you use Stabilized Quaker State, the more enthusiastic a booster you will become. Quaker State Oil Refining Corporation, Oil City, Pennsylvania.

The New

STABILIZED QUAKER STATE MOTOR OIL

LEGALLY SPEAKING

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

by C. R. ROSENBERG, JR.

"I've Been Gypped!"

When a repairman has been tricked by fraud into a contract, what can he do about it after he discovers the fraud? Ordinarily, he can disaffirm the contract and refuse to proceed under it; but he must do that promptly upon discovery of the fraud and he must return any money or other benefits he has received under the contract. If he finds out about the fraud and continues to perform or accept benefits under the contract, then he is bound by the contract regardless of the fraud.

"When one has been induced by fraud to enter into a contract," said a Federal court recently, "he must ordinarily on discovery of the fraud promptly elect whether he will affirm or disaffirm the contract, and if the latter return what he received if of any value. Otherwise he will at law and in equity be held to have ratified and confirmed it."

In some circumstances it may be better for the repairman to stay "gypped" than to upset the whole deal. But once he discovers the fraud, keeps what he has already received in the deal and continues to act under the contract or to accept the other fellow's performance under it, he cannot thereafter raise the cry of fraud.

Must "Mitigate" Loss

If a repairman suffers loss or damage through a breach of contract or some other wrongful act on the part of someone else, he must "mitigate" the loss, that is, do everything in his power to keep it down to a minimum. If he stands idly by and lets the losses mount, he cannot collect for such avoidable losses from the fellow whose default caused the situation in the first place.

A Federal court recently explained it thus:

"The general rule is that one who suffers injury as the result of a wrongful act or a breach of contract is required to exercise reasonable care and diligence to avoid the loss or to minimize the resulting damage."

Protection Against Suit

There are few things more disconcerting to a business man than to be sued by a customer without warning. Most business men are willing to work out an adjustment of a customer's grievance if given the opportunity.

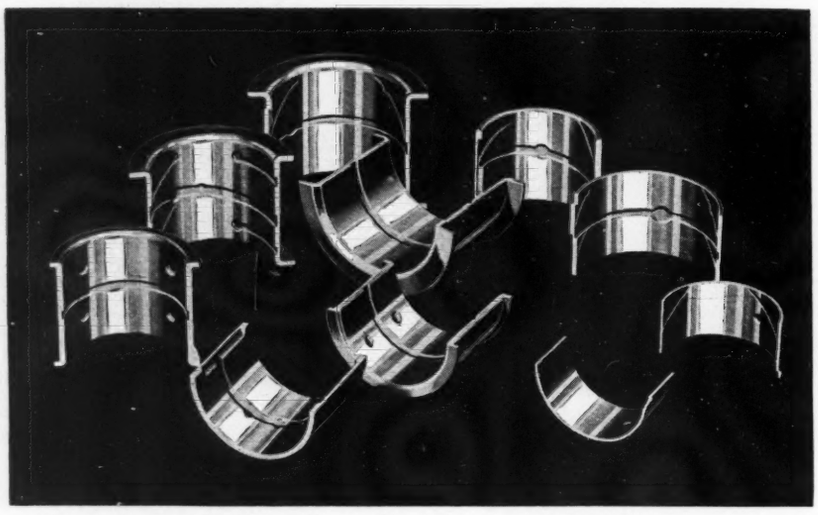
A Massachussetts business house endeavored to assure itself of that opportunity by inserting the following provision in its form of conditional sale agreement signed by its customers:

"The buyer covenants and agrees not to institute any court proceedings against the seller under this contract, at law or equity, until ten days after he has delivered to the seller a signed statement in writing of the details of his claim or claims."

A customer who signed such a contract sued the business house without giving the ten days notice as required.

The Massachussetts court ruled that the customer, in these circumstances, could not bring a suit against the business house without giving the notice.

"The failure of the plaintiff," said the court, "to give the required notice is a defense to this suit."



QUALITY . . . PRECISION SERVICE

● These three words . . . QUALITY . . . PRECISION . . . SERVICE accurately describe Johnson Bronze Automotive bearings.

QUALITY is the result of more than thirty years' exclusive bearing experience. Practically every producer of cars and trucks regard Johnson Bronze as a preferred source of supply.

Write for FREE *Catalogue*

PRECISION . . . the constant adherence to determined tolerances . . . both inside and outside diameters . . . is the result of skilled men plus up-to-date equipment for manufacture. The same standards, demanded in original equipment, govern the production of Johnson replacement parts.

SERVICE . . . ample stocks for every type car and truck are carried at all times. Shipment can be made the same day the order is received. Why not try Johnson on your next order? Write for our complete catalogue . . . it's FREE.

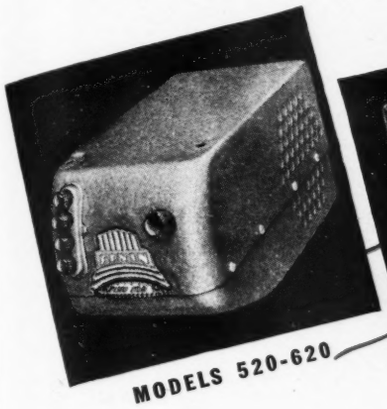
JOHNSON BRONZE

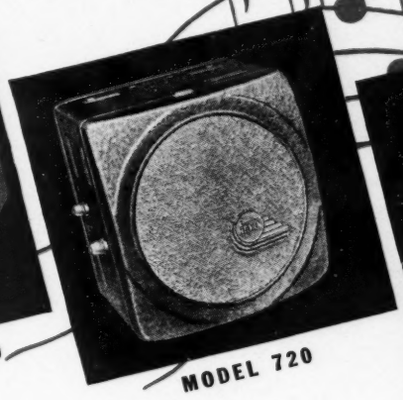
Sleeve BEARING HEADQUARTERS

455 S. MILL STREET · NEW CASTLE, PA.

ARVIN *Car Radios*

- TAILOR-FIT RADIOS WITH
- BEHIND-THE-GRILLE SPEAKERS
- MATCHING PANEL CONTROLS
- ALSO SINGLE UNIT-SETS


MODELS 520-620


MODEL 720

MODEL 820

MODEL 821

ALL WITH THE FAMOUS ARVIN *Phantom Filter*

● Everything your customers want in car radio is now available in the broader and better Arvin line this year. Six models with better-than-ever performance and a lower-than-ever price range—$14.95 to $46.95.

MODELS 520 and 620 are 5-tube superhet single-unit sets that tuck away under cowl and instrument panel. Both have thumb wheel dial for fast, easy tuning. Model 520 has added convenience of push button tuning for four favorite stations. List prices $14.95 and $18.95.

MODEL 720 is a 6-tube superhet with in-the-set speaker and universal or matching panel control. List price with universal control for any car $27.95—with matching panel control $31.35.

MODEL 820 is a 6-tube superhet with 8" in-the-set speaker and electric push button tuning control to match instrument panel. List price $44.95.

MODEL 821 is a 6-tube superhet with behind-the-grille speaker for most popular cars and electric push button control to match instrument panel. List, $46.95.

Order from your jobber now and take advantage of the Arvin "Four-Aces" Deal.

Prices slightly higher West and South.

ARVIN "Four-Aces" Deal

HERE'S HOW you deal yourself 4 Aces in the car radio profit game.

1. Order four or more of the new 1941 Arvin Car Radios, during January, February or March, including at least one electric tuning model.
2. You receive a late Spring dating on this initial order.
3. You receive **FREE Sales Tools**—an attractive floor display demonstrator, wall poster, consumer folders and other selling helps.
4. You receive a **FREE CHAIR** for your service station or home—one of the famous Arvin All-Metal Outdoor Chairs, with initial order for 4 radios—2 chairs with eight radios. Offer expires Feb. 28.

★

Free Sales Material and Free Chair are shipped direct from factory, freight paid. Radios come from your jobber. You just can't "pass" on a deal like this!

NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, INDIANA

Valvoline Celebrates 75th Anniversary

1941 marks the completion of 75 years of uninterrupted existence for the Valvoline Oil Co., makers of the first of the Pennsylvania lubricants, it is announced by G. P. Doll, president of Valvoline.

The parent organization was launched in 1866, Doll explained, by Dr. John Ellis, a Michigan homeopathic physician who became interested in Pennsylvania petroleum products during the Civil War.

Dr. Ellis organized The Continuous Oil Refining Co. which later changed its name to Leonard & Ellis and then to Valvoline Oil Co. to distill and market what was then known as "rock oil." He already had patents which made possible for the first time the commercial refining of steam cylinder lubricants and other oils of good quality. The company started in a very modest way with a tiny ten-barrel superheated steam still.

At that time steam cylinder lubrication was accomplished by means of tallow, suet, lard or compounds of vegetable or animal origin. Severe corrosion and gumming resulted, yet prejudice in their favor was so strong that Dr. Ellis faced enormous opposition with his petroleum cylinder oil. Not until the noted engine builder, George Corliss, adopted the new lubricant did its use spread.

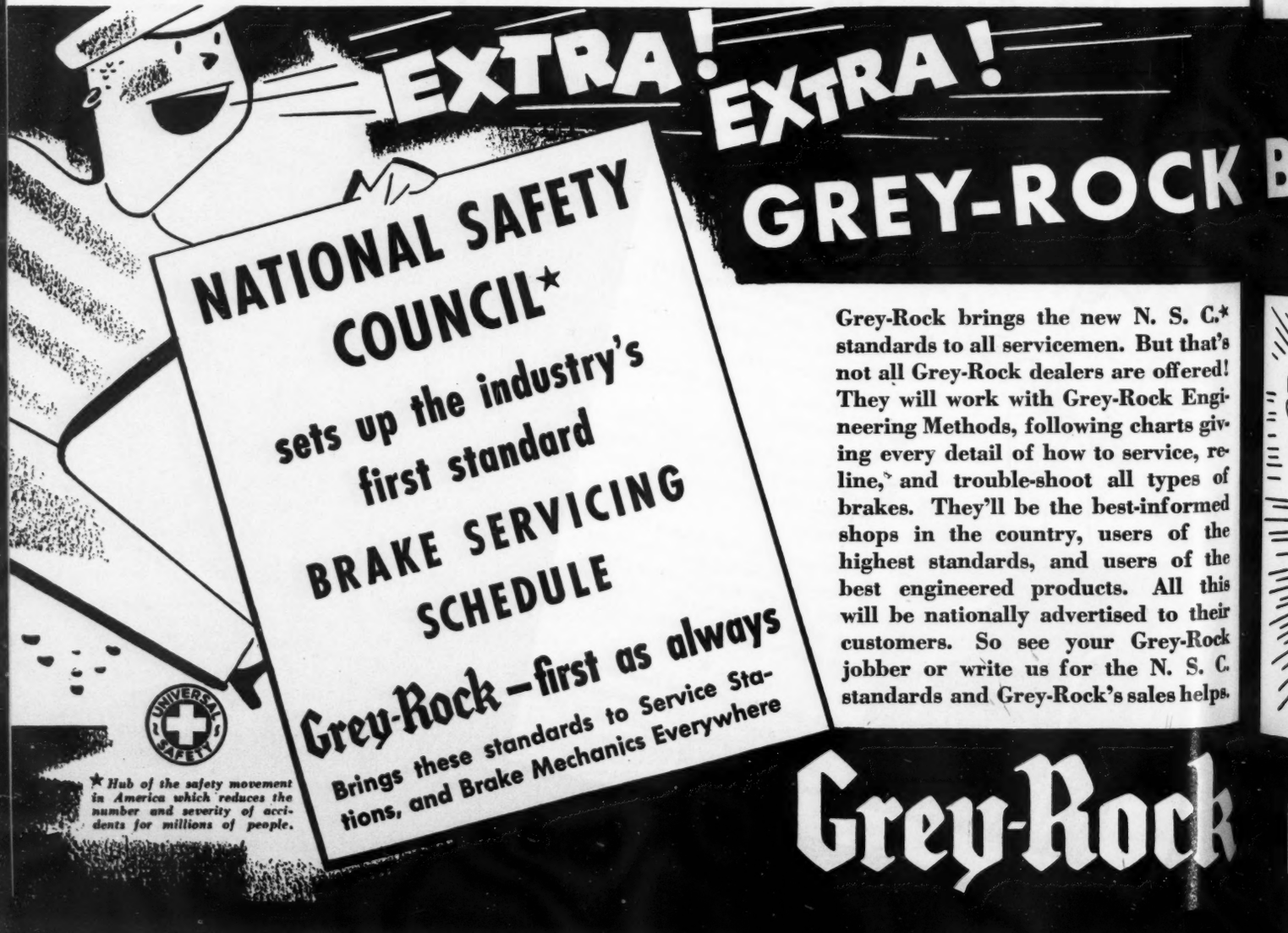
In 1868 the first mineral lubricating oil refinery ever built was erected in Brooklyn. Crude oil was brought from Pennsylvania in wooden tank cars.

The world's first turbine oil was made by Dr. Ellis in 1884 for Sir Charles Parsons of Newcastle-on-Tyne, England, the world's first turbine builder, whose company is still a Valvoline customer.

As early as 1888 Valvoline was being used for gasoline engine oils and when the first American Automobile was built in 1893, by Elwood

PACKARD ELECTRIC HONORED

Civic and other officials attended "open house" at Packard Electric Co., Warren, O., recently. The occasion was to celebrate the company's 50th anniversary and to mark the opening of its new plant to make the company's products—automotive, cable and wiring.


EXTRA! EXTRA!
GREY-ROCK B
NATIONAL SAFETY COUNCIL*
sets up the industry's first standard
BRAKE SERVICING SCHEDULE
Grey-Rock—first as always
Brings these standards to Service Stations, and Brake Mechanics Everywhere
Grey-Rock brings the new N. S. C.* standards to all servicemen. But that's not all Grey-Rock dealers are offered! They will work with Grey-Rock Engineering Methods, following charts giving every detail of how to service, reline, and trouble-shoot all types of brakes. They'll be the best-informed shops in the country, users of the highest standards, and users of the best engineered products. All this will be nationally advertised to their customers. So see your Grey-Rock jobber or write us for the N. S. C. standards and Grey-Rock's sales helps.
UNIVERSAL SAFETY
* Hub of the safety movement in America which reduces the number and severity of accidents for millions of people.
Grey-Rock

Haynes of Indiana, Valvoline was the lubricant.

Throughout its long, successful history, the Valvoline policy has been one of rigid adherence to its original standards of highest quality.

In 1930, Mr. W. Dixon Ellis, son of the founder, retired after 61 years of service. E. W. Edwards is the new chairman of the board of the company.

DeVilbiss Training School 1941 Schedule Announced

The DeVilbiss Co., manufacturer of spray painting equipment, has announced the schedule of its Training School for spray painting equipment users for the first six months of 1941.

This school, which is open to industrial painters, master painters, automobile refinishers and all others interested in learning the technique of spray painting and the use and care of spray painting equipment, will be held at the company's Toledo, Ohio, plant.

Dates for the start of each training period are: January 20, February 17, March 17, April 21, May 19, and June 23. Sessions will last for one week, each.

Early as possible enrollment in the school is advised. Size of classes is limited. Because of the facilities for study available only at these sessions, the DeVilbiss Training School always has, in the past, been well attended.

YEHOODI AT THE WHEEL With comedian Bob Hope and stooges Jerry Colonna, Brenda and Cobina riding as passengers, "Yehoodi" made a big hit with his invisible presence as a driver of this Ford convertible coupe in a Hollywood Christmas parade.

Men attending the school are offered the advantage of special rates in Toledo hotels and boarding houses. These already have been arranged by the DeVilbiss Company.

Complete information about the DeVilbiss Training School may be obtained by writing The DeVilbiss Company, 300 Phillips Avenue, Toledo, Ohio.

N.A.S.F.C. Dissolves

At the annual meeting of the National Assn. of Sales Finance Companies, on December 6 it was recommended by the directors, and voted by the members, that the association be dissolved and that all activities, except those necessary for winding up its affairs, be terminated as of December 31, 1940. The National Association was formed at a two-day meeting held in Chicago on December 10 and 11, 1924.

K BREAKS THE NEWS!

. . . See How YOU Profit from This Powerful Plan to Sell Brake Service in 1941

This new wall chart contains the full N. S. C. Brake Servicing Schedule plus 48 pages by Grey-Rock Engineers of the latest, complete servicing methods for *all* brake systems.

Here is your personal pledge to follow N. S. C. standards complete with the full N. S. C. schedule ready to mount in shop or office.

Here, too, is your personal guarantee, a certificate you give with every job. It explains the standards and methods you use, and tells motorists when to return. **GREY-ROCK SUPPLIES THESE FREE.**

These four great weeklies regularly and repeatedly tell a 50,000,000 audience about your N. S. C. standards, your Grey-Rock Engineering Methods, your Grey-Rock Balanced Brake Linings. Each ad sends motorists to your Grey-Rock dealer sign.

BALANCED BRAKSETS

UNITED STATES ASBESTOS DIVISION
of Raybestos-Manhattan, Inc., MANHEIM, PA.
BRAKE LININGS • CLUTCH FACINGS • FAN BELTS
AUTOMOTIVE HOSE • RELINING EQUIPMENT

SUPER SERVICE IN EUREKA, ILL.

(*Continued from page* 29)

at a time. A yard 90 x 90 feet, also back of the main building, enclosed by a high tight-board fence, affords space for junking operations on trade-in cars entirely out of sight of customers.

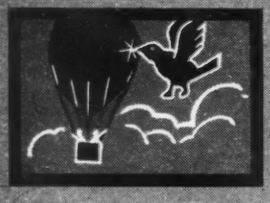
The business is divided into several departments as follows: new car sales, used car sales, garage, parts and accessories, tires, gas and oil, greasing and washing. Three men are employed in the shop, one man as general utility man and one man for gas and oil sales and greasing. At present the gas and oil section is producing $550 a month, tires $200 a month, parts and accessories $800 a month, garage repair work $800 a month, used car sales $8,000 a month, and new car sales at $12,000 a month, a total of $23,350 a month. The total business at the end of the year was near $250,000.

Parts and accessories produce a good profit. Accessories are displayed on open steel display tables located in the spacious lobby of the building.

"The secret of our large increase in garage work, the most profitable end of our business," says Mr. Heyl, "comes from super service. Our lubrication department is most modern, with two lifts, so that service is rendered to two cars at one time. We lubricate about 100 cars a month. The men who take care of the greasing and of gas and oil sales, as well as our garage employees, are trained mechanics. In greasing cars, every car is thoroughly checked and the findings reported to the car owner. The contacts formed at the grease rack sell more parts, accessories and repair jobs than any other department of our business. We sell a lot of mufflers, spark plugs, batteries, etc., from these contacts. We keep a card record of greasing jobs and mail out cards when the time is near for another lubrication. This keeps customers coming in, and every time they come in gives us another opportunity to sell repair work, parts, and accessories. And this is not all—every customer tells his friends about the type of service he receives and many of the latter come in and are added to our list of permanent customers. Word-of-mouth advertising, backed up by our real super service, is the best possible form of advertising.

"Super Service provides plenty of leads for new and used car sales.

"Our gas business amounts to about 5000 gallons a month. Gas customer contacts are also responsible for a considerable number of sales of accessories and quick repair service. Located on a trunk highway, many gas customers are transients. Many of these transient customers need spark plugs and other accessories and minor adjustments. With our facilities, we can take care of this business with dispatch, and many a job comes from transient customers."



"dag" *colloidal graphite is non-injurious to rubber car parts*

Use a rubber lube containing "dag" colloidal graphite on those squeaky shackles, engine mountings — any rubber part that is giving "Birdies" trouble. It is harmless to rubber and will stop the "comebacks."

Acheson worked out the formulas which have been patented with "dag" colloidal graphite as the basic part. Its minute particle size makes quick penetration sure. And the presence of the solid lubricant keeps the squeaks away longer. Any gun giving a needle stream may be used to apply these rubber lubricants — they are NON-POISONOUS, NON-INFLAMMABLE, and WILL NOT ATTACK CAR FINISHES.

Selected marketers blend and package "dag" colloidal graphite rubber lubricants under their own trade-marks. We will gladly supply the addresses of several such companies. Send for folder.

ACHESON COLLOIDS CORPORATION
PORT HURON MICHIGAN

dag COLLOIDAL PRODUCTS

Briggs Joins Behel & Waldie

Behel and Waldie, Chicago advertising agency, announce the association with their firm as of Dec. 1, 1940, of George L. Briggs, formerly executive vice-president of Wilkening Manufacturing Company, Philadelphia.

By reason of his activities in the automotive field during the nearly nineteen years of his previous connection, George Briggs brings to Behel and Waldie and their clients an intimate knowledge of the distribution and marketing of automotive products.

TURRET TOP REPAIRS

(*Continued from page* 31)

bumping, which will follow later.

Fig. 6 is reforming the drip moulding along the right side of the car by the use of a special drip moulding plier.

Before any finish bumping is done, it is advisable to go over the surface of the top with a piece of chalk in order to show up the high and low spots while hammering. We see the results of this operation in Fig. 7.

Using a bumping hammer and the correct dolly, finish bump the top panel, as shown in Fig. 8, being careful to preserve the original contours.

When the finish bumping has been done, it is necessary to sand all of the damaged portions. In carrying out this operation, it is well to remember that the correct position of the sander in relation to the work is that the disc must be held flat against the metal as in Fig. 9.

Following the sanding of the metal, it is advisable to go over the damaged portion with an adjustable type file, to detect any high and low spots which may have been overlooked in the sanding operation. Fig. 10 shows the operator with the file adjusted to the countour of the top.

When the repairs are completed, as shown in Fig. 11, the body should be given a final "x" check for alinement, the door replaced and checked for fit and alinement.

After the body and door has been checked and found to be O.K., the windshield, interior trim, seats, upholstery and hardware are replaced. This completes the repair job, and it is ready for painting.

The experienced body man will recognize that no two wreck jobs are exactly alike. However, the fundamental principles, as outlined, can be applied to a majority of jobs requiring turret top repair.

PRODUCTION

(*Continued from page* 50)

showed gains over the previous December.

Ford Motor Co. entered into the supplying of U. S. Army trucks with receipt of an order for 1,500 midget vehicles of ¼ ton capacity. These rugged vehicles are powered by a 42-h. p. adaptation of the Ford tractor engine and will travel nearly 60 m. p. h. They carry three men and a machine gun and are devised to replace the motorcycle and sidecar which were used so effectively by the Nazis in their invasion of the Low Countries and France. American Bantam and Willys-Overland also each have orders for 1,500 of these trucks.

Hudson Motor Car Co. has entered the national defense picture with announcement by the Navy Dept. that the company will build and operate a $12,000,000 ordnance plant near Detroit to manufacture parts for gun mounts and torpedo tubes.

General Motors' defense orders for the U. S., Canada and Great Britain exceed $469,000,000 according to Chairman A. P. Sloan, Jr. Approximately half of this amount, or $234,500,000, is in orders for the Allison liquid-cooled aircraft engine, which is being produced at a rate of 350 monthly at Indianapolis.

Softens Brake Action

A new product known as Delairs Brake Remedy has been developed by Delairs Brake Remedy, Millersburg, Ohio. It is a liquid, chemically compounded. A small quantity spread on the surface of the brake lining is said to produce soft pedal action and give the "feel" of hydraulic brakes to mechanical brake equipped cars. Price $1.00 per pint.

Light
75 CANDLES

It's Diamond Jubilee Year
for the First Pennsylvania Oil

You expect *firsts* from Valvoline. The leading independent of the lubricating industry has a habit of making news with trail-blazing developments. Now 1941 adds another to Valvoline's long list of "famous firsts". It is the first petroleum lubricant in America to celebrate 75 years of continuous service!

What This Means to You!

You and your customers could ask no finer proof of Valvoline excellence. As the first Pennsylvania oil to reach its 75th birthday, Valvoline promises you many more *firsts in leadership* during the years to come!

Costs more to make -- costs less to use

VALVOLINE

VALVOLINE OIL COMPANY, 540 East 5th Street, Cincinnati, Ohio
New York - Chicago - Atlanta - Los Angeles. Refinery in Pennsylvania.

SERVICING THE RADIAL ENGINE FOR NATIONAL DEFENSE

(*Continued from page* 33)

at every second revolution of the crankshaft; therefore, the firing order follows around the circle, firing cylinders No. 1, 3, 5, 7, 9, 2, 4, 6, 8, to complete the firing of all cylinders on a 9-cylinder job.

As you stand facing the front of the engine, its direction of rotation is counter-clockwise. In other words, the propeller corresponds to the flywheel, and the engine is installed in the plane with the flywheel toward the front instead of toward the rear, as in the installation of an engine in a truck or passenger car. The center cylinder at the top is numbered 1; the cylinder to the left is number 2 and so on, around the engine in a counter-clockwise direction.

Cylinders are of aluminum with inserted steel sleeves, with the cylinder heads screwed and shrunk on forming a permanent connection. Each cylinder is a separate unit, bolted to the crankcase. The crankcase is made in circular sections consisting of the front, center and rear sections, or in some cases the crankcase is made in five sections.

The crankshaft has a single throw, and is made in two sections—front and rear. It is joined together at the connecting rod journal, one-half fitting into the other like a telescope, and the two halves are held together by a bolt lengthwise through the journal. Main bearings are ball or roller type.

Each cylinder has two halves, an intake and an exhaust, located in the head and operated by push rods. The cam which operates the push rods is contained in the front section, and runs on a sleeve on the crankshaft. It is driven at one-eighth crankshaft speed, and turns in the opposite direction to the crankshaft rotation.

The connecting rod arrangement differs radically from the conventional engine. There is one master connecting rod, the crankshaft bearing end of which is solid instead of being of the split type necessitating the two section crankshaft previously mentioned. Bushings are inserted in the rod, and bear directly on the crankpin. Eight I-section link-rods are attached to the master connecting rod bearing end by pins resembling piston pins, known as knuckle pins. Each rod has a bronze bushing for the piston pin and the knuckle pin. Oil is supplied under pressure to the master connecting rod bearing and to the link-rod knuckle pins. Lubrication to the piston pin is by splash from the cylinder walls. The lubrication system is the dry-sump type, circulation being provided by a pressure pump and a scavenger pump.

Pick - the complete line of OIL FILTERS for every car, truck and tractor

The Pick line is so complete that there is no need for you to miss a sale. Priced within the means of millions of owners of cars and trucks. List prices start at $1.50.

Honey Model · Blackline · Redline · Blueline · Standard Model · Supreme Model

PICK "HONEY" OIL FILTERS are of the replaceable cartridge type, having non-channeling, acid-absorbing element. "HONEY" Filter, Model P3, to be mounted in the bracket previously occupied by factory filter, lists at only $2.70.

PICK REGULAR LINE of replacement oil filters interchangeable with original equipment filters includes the Blackline Non-Magnetic Filter, listing at $1.50 each; the Redline Magnetic Type Filter, listing at $2.00; and the Blueline Magnetic Type Filter listing at $2.25.

PICK STANDARD MODEL Permanent Oil Filter with magnetic separator is the best Pick Filter made for installation on engines having crankcase capacity of 7 quarts or less. List $4.75.

PICK SUPREME MODEL, listing at $5.25, is same as Standard except that it is larger and is for installation on tractors, cars and trucks having crankcase capacity of 8 quarts or more.

Also REPLACEMENT CARTRIDGES for practically ALL permanent type Oil Filters ... List at only 95c each, and up

P1X & P2X · P16X · P17X · P18X · P19X · P3X · P15X · P10XF

The high quality will please you and your customers, and the low prices will amaze you. If you don't know all about this easy-to-sell, profit-producing line, ask your Pick jobber or write us for details. Also get latest information on complete line of Replacement Water Pumps.

PICK MANUFACTURING COMPANY
WEST BEND, WISCONSIN

FORD TO BUILD "PYGMY" TRUCKS FOR U. S. ARMY

(*Continued from page* 52)

idling axle. There is an auxiliary transmission in addition to the regular gear box, which provides six speeds forward and two in reverse.

The Ford truck has an 81-in. wheelbase and stands 38 in. high at the cowl. It is equipped with 5.50 by 16 tires with heavy mud and snow tread. There are blackout lamps front and rear in addition to the regular lighting equipment. A brush guard protects the front of the car and there is a windshield which folds flat over the hood. There also is a folding top or canopy.

Why the CHEVROLET FRANCHISE is always being SOUGHT BY DEALERS instead of being sold to dealers by high-pressure solicitation

1 Chevrolet dealers enjoy the highest volume of passenger car and truck sales, year after year

2 Chevrolet dealers score the highest average unit sales per dealer of any organization in the industry, year after year

3 Chevrolet dealers lead in used car sales, year after year

4 Chevrolet dealers alone—of all dealers in the industry—operate under the fine, friendly policies of Chevrolet's famed Quality Dealer Program

5 Chevrolet dealers have the leading low-priced car for 1941—the leading low-priced truck for 1941—the biggest selling products in the biggest sales field

6 Chevrolet dealers are on their way to sales leadership in the industry again in 1941, just as they have taken leadership in passenger car sales for nine of the last ten years

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN

Facts . . . Figures . . . Dealer Favor . . . All Prove That . . .

Again CHEVROLET'S THE LEADER

WHEN YOU HAVE THE CHEVROLET FRANCHISE YOU HAVE FRIENDS

$6.00

EXTRA PROFIT for YOU

Get set for your Spring WHIZ MOTOR RYTHM business while you can make this *extra* profit....One dozen 8 oz. cans of MOTOR RYTHM, retailing for $6.00, FREE with your order for $15 or more of MOTOR RYTHM.

MOTOR RYTHM is the one "tune up" that cleans, lubricates and protects. Gives you an extra profit opportunity on every gas sale, every oil change, every oil filter cartridge renewal, every motor overhaul, every new car sold.

Consistent advertising in The Saturday Evening Post, *every other week,* has sold the MOTOR RYTHM habit to hundreds of thousands of car owners. Powerful MOTOR RYTHM merchandising aids draw these pre-sold customers to you.

Whiz

Ask your jobber salesman to show you the WHIZ MOTOR RYTHM Profit Program.

MOTOR RYTHM

R. M. HOLLINGSHEAD CORP., CAMDEN, N. J.

ADJUSTING THE PACKARD ELECTROMATIC CLUTCH

(*Continued from page* 35)

adjust engine speed adjusting screw "I" to give 7/32 in. gap at "J."

4. Spool valve rod adjustment—with engine warm and running at idle speed, and gear shifter lever in neutral position, depress accelerator pedal to take up clearance at "J," then adjust spool rod at "H' in or out of the clevis until the power cylinder piston rod just starts to move. To check this adjustment, put the car in low gear and depress the accelerator pedal slowly—car should just start to creep at about 900 r.p.m. engine speed. If it starts to creep too soon, close up the gap at "J" by turning screw "I" in.

5. Low and reverse engagement—two adjustments are provided, the Allen head screw "K," for starts in low and reverse, and the knurled head screw "M" for starts in second and high. Movement of "K" affects the adjustment of "M" and for this reason "K" should always be adjusted first. Check action of solenoid (6, Fig. 1) first by turning on ignition switch, with engine not running. If the adjusting screw "K" moves into the solenoid body, the action is satisfactory. Start the engine, and shift into low—if the clutch grabs, turn adjusting screw "K" in (¼ turn at a time) until clutch engagement is smooth at about 900 engine r.p.m. If the clutch engagement is too slow and shows a tendency to slip, turn "K" out one turn at a time until the clutch grabs and then turn it in ¼ turn at a time until the engagement is smooth.

6. Second and high engagement—made after adjustments outlined in paragraph 5. Car should just start to creep at about 700 engine r.p.m. in second gear. If engagement grabs, turn knurled head screw "M" in ¼ turn at a time; if it slips, turn "M" out until clutch grabs and then turn in ¼ turn at a time until action is smooth.

7. Full throttle engagements—adjustment made on the road, making full throttle engagements in second gear. Engagements should be as sharp as possible without causing the engine to stumble upon full clutch engagement. Screw plug "N" out until the clutch grabs and then turn it in one notch at a time to the point where engine will not stumble upon full engagement. If clutch slips excessively, back out the second and high adjusting nut "M" to reduce slip.

8. Shift down from high—make the adjustment at direct speed switch "9," Fig. 1, located on outside of transmission case under second and direct speed shifter lever, using an ignition timing light. Remove both wires from terminal and clip to one lead of test light. Clip other lead to switch terminal. Place gear shift lever in high. Turn on ignition switch, but do not start engine. Test light should not be lighted. Move gear shift lever toward neutral. Light should come on after all slack in linkage is taken up, and just before transmission levers move out of high engagement. Adjust switch in the bracket until light indicates switch is opening and closing properly. Thread switch into bracket to make switch close (light comes on), and out of bracket to make switch close later.

9. Accelerator switch:—Make adjustment at switch "10," Fig. 1, control rod turnbuckle, using ignition timing light. Remove either wire from switch terminal and clip one lead of light to the switch terminal from which wire was removed. Clip other lead of light to battery terminal on relay "3," Fig. 1. With ignition switch off, light should burn. Depress accelerator pedal slowly, and light should go off just after stop on the control valve lever "J," Fig 2, contacts the engine speed adjusting screw "I," but before carburetor throttle lever begins to move. If light goes off too soon, shorten the control rod at the turnbuckle.

If, when making these mechanical adjustments, it is impossible to obtain proper action, a check of the electrical circuit should be made. The first check is of the fuse located in the wire from the starter to the "BA" terminal of the relay "3," Fig. 1. Remove wire from "BA" terminal, clip one lead of test light to wire and ground the other on the dash. If light comes on, fuse is O.K.; if it doesn't,

replace the fuse. Move the harness back and forth to check for momentary short—light should not blink. Remove the grounding clip from the dash and touch the relay post—if light burns it indicates defective relay, and relay should be replaced.

Check transmission switches—with ignition switch on, depress accelerator pedal to break circuit to the governor. Move shifter lever back and forth from high to neutral—you should hear a click in the relay when the contact is made and broken. The low and reverse transmission switch should do the same in low and reverse gears, except that the accelerator pedal does not have to be depressed. Remove yellow wire from second speed solenoid "11," Fig. 1. Clip a light to the starter hot post and the loose clip to the wire from the second speed solenoid. Light should burn when shifter lever is put into second gear.

Check relay for shorts:

1. Clip trouble light to relay post "BA," Fig. 3. Touch other trouble light clip to relay post "AD." If light burns, the governor "AD" contact points are stuck or there is a short in the center field winding of the relay.

2. Touch relay post "IG" with loose clip of trouble light, other clip still on "BA" post. If light burns, terminal or internal wiring is shorted, or there is a short in the wire to the lock-out switch or in the switch itself.

3 With the lock-out button pulled out, touch terminal "EC." Light should burn brightly. If the light does not burn with the shifter lever in high gear (ignition switch off) there is a bad contact point connection in the governor switch (Fig. 3), or there is a bad connection in the accelerator switch (Fig. 3).

4. With light connected between "BA" and "EC," switch off, depress accelerator pedal and move shifter lever in and out of high gear position. Light should go off in the high gear position, and come on when shifter lever is moved to neutral. Replace direct speed switch (Fig. 3) if light does not go off.

Test solenoids:—Ground relay post "AD" (Fig. 3) with ignition switch "on." Clip trouble light to relay post "S2" (Fig. 3) and ground other clip to dash. If light does not burn, tap relay with handle of screwdriver. If light comes on during this tapping, central field points of relay are sticky, and relay should be replaced. Clip trouble light to starter hot post, ignition key off and gear shift lever in neutral—touch both terminals of solenoid valve "2," Fig. 1, in air bleed line. If light burns, a short in windings or terminal insulation is indicated. Remove wire from first and reverse solenoid at back of control valve "6," Fig. 1. Clip light to end of wire, ground other clip and turn on ignition switch. Light should burn when relay post "LR" (Fig. 3) is grounded. To check wiring to direct speed solenoid "4," Fig. 1, on bottom of control valve, ground one light clip and touch the other to the terminal on the solenoid. Wih ignition switch on, light should burn. If light does not burn, the clutch control points in the governor are open or the accelerator switch is out of order. If both check correctly, replace relay.

Garagemen Elected

Dewey Randolph of the Boulevard Garage, has been elected president for the next year of the Portland Automotives Trades Association. Other new officers elected included, first vice-president, Rance Niles, Rotoway-Rance Niles, Inc., second vice-president, N. A. Nelson, Heathman Hotel garage; secretary John M. Bates, Bates Motoramp Garage; treasurer, K. R. Crookham, Wiggins Company.

Directors, George Rotegard, Tracey & Co. and William Schei, Schei Motor company. Department vice-presidents: Auto laundry, H. D. Newlee, 15th St. Automotive Service; Battery and electrical, Art Donaldson, Medical Arts Battery & Electrical Service; Machine shops and regrinders, V. C. Unden; Factory Motor Car Co. Parking lots, Dwight C. Thorsen; Rebuilders and refinishers, E. J. Nelson; Repair Shops, Sig Kolden; Retail gas & oil, Bert W. Gates; Storage Garages, W. E. McKenny, Portland Garage, Inc.

Why it pays to concentrate on Whiz

Ninety-eight car beauty and maintenance products.... All identified by the trade name "WHIZ."...All produced by the world's oldest and largest manufacturers of automotive chemicals.

The WHIZ line is complete...attractive...of known quality and dependability. Each fine product helps to sell the others.

Whiz

Concentrate your buying. Let the name WHIZ be your guide to bigger volume and profits.

CAR BEAUTY *and* MAINTENANCE PRODUCTS

POLISHES • CLEANERS • TOP DRESSINGS • TIRE COATINGS
RADIATOR SPECIALTIES • BRAKE FLUIDS • ENAMELS
SHOCK ABSORBER FLUIDS • GASKET CEMENTS • SOAPS
ABRASIVE COMPOUNDS • SPECIALIZED LUBRICANTS

WORLD'S OLDEST AND LARGEST MANUFACTURERS OF AUTOMOTIVE CHEMICALS

FLAT RATING FRONT WHEEL ALINEMENT

(*Continued from page* 24)

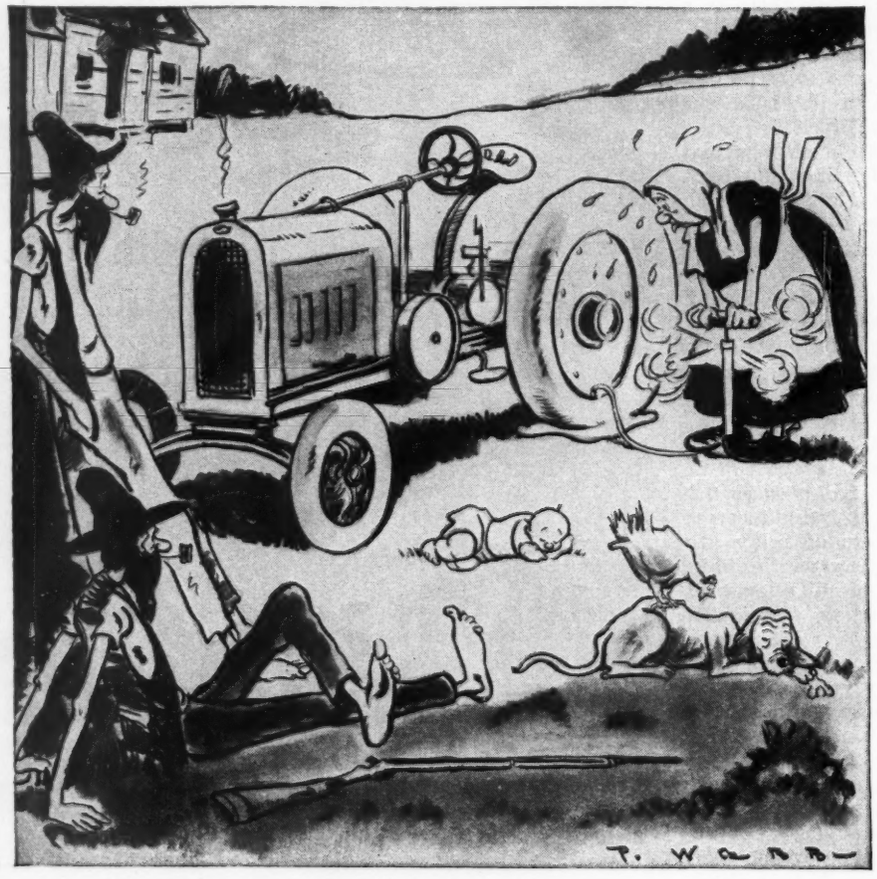
right wheel. Naturally, the brace rods on the right side will have to be loosened at points "C" and "D" before the brace rods on the left side, "A" and "B," can be tightened.

The desired camber setting is 0 deg. to ½ deg. positive, so care will have to be exercised when making this adjustment, working on both wheels at the same time, to draw the transverse bar to the right or left the correct amount to get the proper setting for both wheels at the same time.

The steering arms of this model point toward the front instead of to the back, and the tie rods are ahead of the front axle channel instead of behind it, as in the conventional type of construction.

When checking toe-in, the first step is to set the front wheels in a straight-ahead position. If this cannot be done accurately by eye, it will be necessary to disconnect the steering connecting rod from the drag link. Then turn the steering wheel until the gear is on the high point of the worm, indicating the center position. If a further check is desired, remove the steering wheel; line up the line on the underside of the steering wheel hub with the wide serration on the lower side of the steering tube. With these two points in line, and the spokes on the steering wheel exactly horizontal, the steering gear will be in the center position.

The correct setting for toe-in is 0 to 1/16 in. measured at a point approximately 10 in. from the floor. To get this setting, turn each tie rod end an equal amount so that there will be 1/32 in. toe-in on each wheel. When finishing the toe-in adjustment, be sure that the tie rod adjusting clamp bolts are toward the ground. This is necessary to prevent the bolts from striking the body sill when the front wheels go up over a bump.



"Shecks—Gran'maw's gittin' wore to a frazzle . . . mebbe we orter tell her about the Schrader Spark Plug Tire Pump."

The Spark Plug Tire Pump is but one of many popular Schrader accessories and service station equipment products. Its value to motorists, truckmen and farmers in providing mechanical air service wherever needed, makes it a very profitable article to sell. Ask your suppliers' salesmen about the Pump and other Schrader accessories and about Schrader equipment for efficiently handling air in service stations and repair shops.

Schrader

REG. U.S. PAT. OFF.

AIR CHUCKS, BLOW GUNS, HOSE COUPLINGS, QUICK-ACTING COUPLERS, TIRE GAUGES, TIRE VALVES, VALVE CORES, VALVE CAPS

A. SCHRADER'S SON Division of Scovill Manufacturing Company, Incorporated BROOKLYN, N.Y.

TRACTOR SERVICE

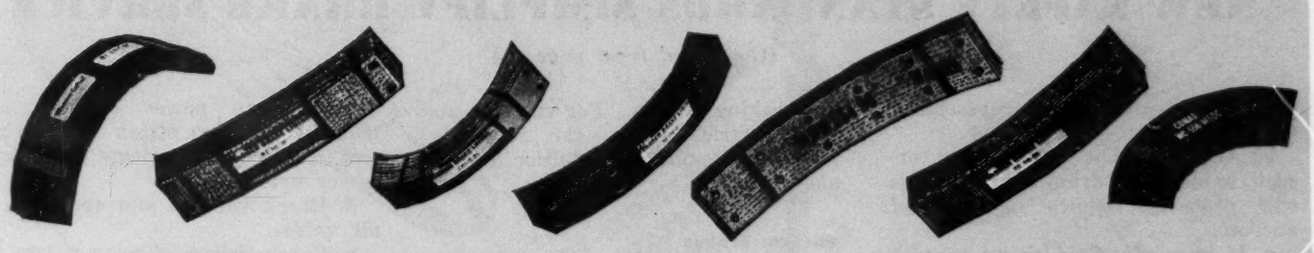
(*Continued from page* 39)

To solicit this business, you may have to go out after it. Driving out to the farm with a small truck equipped with tools, replacements and supplies is not too difficult. Many farms are equipped with electric power to enable you to use power-driven tools and make repairs on the spot. Farmers appreciate this type of service and there's an extra fee you can charge for the drive out and return, over and above labor and parts.

The need for tractor service is likely to increase in 1941. A shortage of farm labor, the trend toward general mechanization of farm machinery has the farmer thinking in terms of power units that will handle one or more plows, harrows, cutters and other implements for planting, cultivating and harvesting their crops.

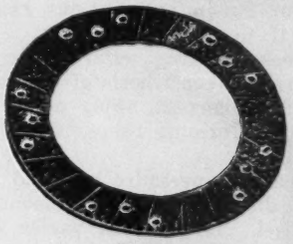
Three hundred and forty thousand tractors entered the market in 1938 and 1939. These have been given from one to two years of hard, laborious usage and are ready for a complete check-over.

Tune up those tractors for plus profits this year. MOTOR AGE will help you with a series of maintenance articles dealing with maintenance procedure on tractor units, beginning in the next issue.



WAGNER BRAKE LINING

is available in six types to meet every need



As manufacturer of Lockheed hydraulic brakes, Wagner has a valuable background of experience in braking problems and is well equipped to know the type of lining a brake should have. This knowledge is reflected in the Wagner Sextet described below.

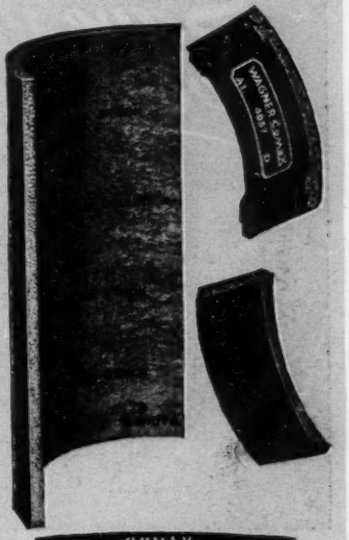
CoMaX is the finest in molded brake lining. It is ideal for quick, safe, smooth stops. It is long-lived, has reinforced backing, is non-compressible, uniform in texture, easy on drums, ideal for high speeds, quiet and smooth in operation and age-proof. In short, Wagner CoMaX is the answer to car owner's demand for a dependable and high-quality brake lining. Available in rolls, sets, blocks and slabs.

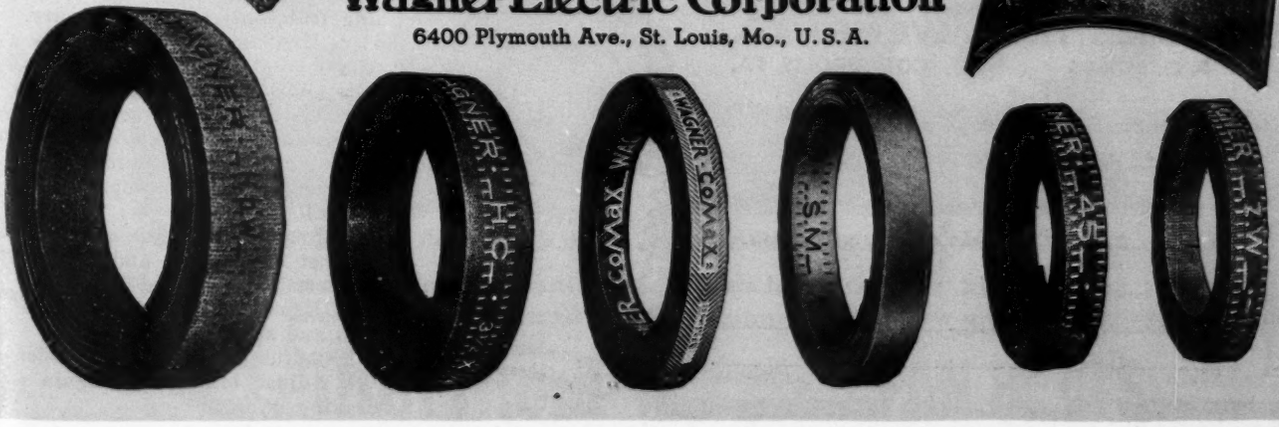
Wagner SM (Standard Molded) is flexible and heat resisting. **Wagner ZW** (Zinc-Wire Woven) is a high-grade average-friction, medium-priced woven lining, ground on one side. **Wagner "45"** is a low-priced woven lining made from asbestos fibre and brass wire, ground on one side.

Wagner HDW (Heavy Duty Woven) is a high-friction woven lining of the highest quality. Ground on both sides. It is closely woven, tough, compressed to great density, and thoroughly impregnated.

Wagner HC (Hydraulic Compressed) is intended for tough jobs. A multiple-ply folded and compressed type of brake lining and fabricated from a base of open-weave, wire-reinforced asbestos cloth. Thoroughly impregnated and ground on both sides.

Ask your Wagner jobber for details on all types of Wagner Brake Lining and also on Wagner Clutch Facings.





AUTOMOTIVE PARTS DIVISION B40-7C

Wagner Electric Corporation

6400 Plymouth Ave., St. Louis, Mo., U.S.A.

NEW SAFETY STANDARDS SIMPLIFY BRAKE SERVICE

(*Continued from page* 41)

change the shoe and lining assembly. Check lining to drum contour.

b. Adjust so that lining makes correct contact with drum surface. This will probably require resetting of anchors.

c. If hydraulic fluid shows gumminess or contamination with dirt or other foreign matter, flush and refill with standard grade.

The foregoing applies primarily to the braking system. For vacuum, air and electric brakes, the following procedure applies in adidtion to the above:

Vacuum Brakes

a. Check entire system for leaks.

b. Examine pipes and hoses for kinks, wear or collapse. Check trailer hose and connections when used.

c. Examine power cylinder and make certain that piston does not bottom in cylinder. Lubricate piston type power cylinder.

d. Check vacuum and operation of all valves.

e. Check timing of relay valves for synchronization between tractor and trailer brakes.

f. When vacuum is used in conjunction with hydraulic system, check line pressure; when used in conjunction with mechanical system, examine lever setting for maximum efficiency and measure effective force of power cylinder.

Air Brakes

1. Minor

a. Check entire system for leaks.

b. Examine pipes or hoses for kinks or wear. Check trailer hose and connection if present.

c. Drain all reservoir tanks and in cold weather install approved antifreeze in tanks or examine and fill alcoholizer if present.

d. Check compressor; check governor for cut-in and cut-out range. Adjust if necessary.

e. Check braking effort between axles and between wheels of the same axle. If not correct, apply major inspection, performing Steps "f" to "i."

2. Major

f. Check air pressure required for one inch diaphragm rod movement of each wheel. If pressure varies disassemble brake chambers, examine diaphragm, and install correct springs.

g. Adjust slack adjustors or cam levers to correct angles.

h. Check relay valves for synchronization between front and rear axle and between tractor and trailer brakes.

i. Adjust brakes and again check braking effort.

Electric Brakes

1. Minor

a. Examine all wiring and connections on tractor and trailer.

b. Check amperage for each brake.

c. Check timing and braking effort between trailer and tractor, adjusting foot controller if necessary.

d. Examine safety break - away chain and safety switch. Check emergency battery.

e. Check braking effort between wheels on trailer axle. If necessary to make further examination or adjustments perform Steps "f" to "i."

2. Major

f. Remove wheels and examine magnet connections and face, bronze support bearings and lugs.

g. Examine armature, spring tension and support bolts.

h. Adjust armature depression.

i. Adjust brakes and again check braking effort.

Save up to 40¢ out of every repair dollar!

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Steam Cleaner

Where mechanics work on dirty, greasy engines, chassis, transmissions, parts, etc., Hypressure Jenny Steam Cleaning before repair saves up to 40 cents out of every dollar of labor cost. As the first step in your car reconditioning program, Hypressure Jenny Steam Cleaning will help you get $15 to $50 more for used cars. Also, with Hypressure Jenny, you can do many extra profit-service jobs such as motor and chassis cleaning. Don't put off gathering these extra dollars any longer! Find out now how much Hypressure Jenny can save YOU. Send for free survey.

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O. K.— Send that Survey.

We recondition, repaint, repair.....cars or trucks monthly.

We employ.....mechanics on dirty, greasy repair work.

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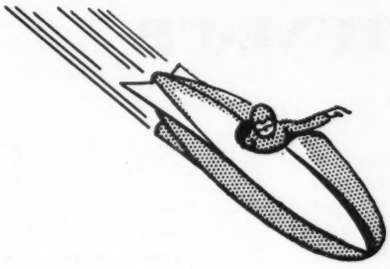
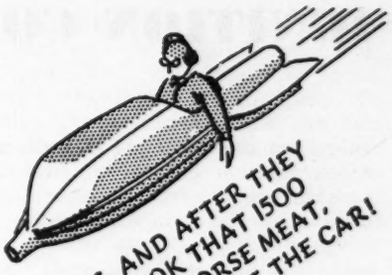
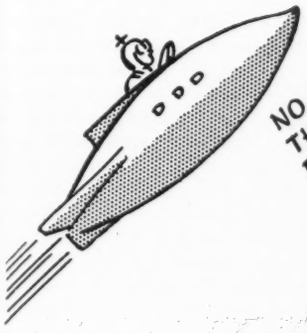


SAY! THAT'S ONE OF THOSE THERMOID PRE-STRETCHED FAN BELTS!



YES. AND AFTER THEY UNHOOK THAT 1500 LBS OF HORSE MEAT, IT'LL STILL FIT THE CAR!



NO WONDER THERMOID FAN BELT SALES ARE ROCKETING.

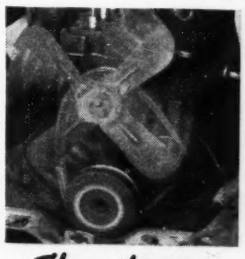
It's a Fact!

A Thermodized Pre-Stretched Belt was removed from service on a car, the weight of a horse suspended on it—and then when the belt went back in service, it performed perfectly at the original adjustment, proving that the belt had not permanently stretched at all.

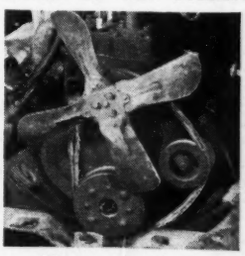
You Bet I'm a Horse of a Different Color

THESE PICTURES SHOW THE LIFE CYCLE OF AN ORDINARY FAN BELT

First it STRETCHES

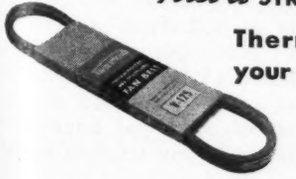


Then it SLIPS



Then it WEARS

Then it FAILS



Thermodized Pre-Stretching stops fan belt troubles before they start. Boost your sales with Thermodized Pre-Stretching—the big new money-maker in fan belts!

Thermoid *Thermodized* PRE-STRETCHED **FAN BELTS** THERMOID CO. TRENTON, N. J.

IGNITION COILS VITAL TO TUNE-UP

(*Continued from page 22*)

they used this principle in make-and-break ignition on gas engines. The breaking—and hence the spark—was done inside the cylinder.

"The next step along the path toward the present day system," Sam continued, "was to add another coil around the iron core, like I show here in Fig. 3. We leave the primary coil like it was, but the second coil, or secondary winding, is connected to a delicate meter. When we open and close the switch on the primary coil we will find that we get a brief shot of current in the secondary, as shown by the meter. This means that any change in the magnetic field of the iron core, in this case caused by turning the switch on or off in the primary, also produces some voltage in the second coil that is not connected to the battery in any way. This is the principle that all transformers work on, and I think Sparks over there with all his radio knowledge will bear me out. That's really what an ignition coil is—a transformer—because it takes in one kind of current and gives off another kind.

"So far we haven't got a real ignition coil in these drawings because, for automobile ignition we need a very high voltage, and that requires plenty of turns of wire on the secondary. We'll have to wind our primary with just a few turns of fairly heavy wire, but on the secondary to get 12,000 or 15,000 volts, we'll need thousands of turns, but because we need only a trace of amperage with it we can use a very, very small wire. Here in Fig. 4 I show the circuits in a complete but simple system for a one-cylinder engine, and you'll notice that the secondary has by far the most turns. To make it work we also have to have a timer, and a condenser to stop the arc at the breaker points. We can use this same system on an engine with 4, 6 or 8 cylinders by adding a distributor to send the spark to the right cylinder at the correct time.

"Now that's how a coil works," Sam went on, "but just any kind of an ignition coil won't work satisfactorily on all engines. Coils have a thing known as speed. This speed is the time they require to saturate their core with magnetism, and then to release it in the form of a hot spark. Good coils are engineered just like a complete automobile, and the size and quality of the iron core, the way it is placed, the size and turns in the primary, the ratio of secondary turns to primary, and the quality of the insulation are just a few of the things that make the difference between a cheap coil and a good coil."

"You'd better explain more about this thing you call speed in a coil," Red Roberts interrupted. "I always thought there were just two kinds of coils—good ones and bad ones."

"It's like this," Same came right back. "You wouldn't pick out a good plow horse and put him on the race track, would you? Not if you expected any speed. Well, it's the same with coils. A coil can do a first-class job of sparking a slow speed heavy duty engine but be a failure if you put it on a high speed eight and try to go at top speed. To fire a row of cylinders at high speed you must have a coil that was designed for high speed use. I've had cars come to me that would run fine up to maybe 50 or 60 miles per hour, but sort of fade out if you tried to horse

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Out West it's PRECISION BEARINGS, INC. Los Angeles

them above that. I've put the right type of coil on some of those jobs and boosted them another 20 or 30 miles an hour—and without doing anything else.

"I think that explains the difference betwen an ordinary coil and one built for modern high speed use, so now let's look at the difference between a well-made coil and one made to sell at a low price. First let's look at this sketch. (Fig. 5.) Here I've tried to show a section of a coil so the method of construction can be seen. First we have the core that consists of a group of iron wires. Now some kinds of metal will take on a stronger saturation than others, or in other words, build up a strong field quicker and better. Good coils have a special grade of wire; cheap ones have just any kind.

"To get a spark at the least expense some cheap coils are short coiled on the primary winding. By that I mean they use fewer turns of wire. Such a coil uses more battery current and usually runs plenty hot. You can build up a field in a coil with a good core and a lot of turns on the primary, or you can cheapen up the whole thing by using a poor core, fewer turns and then shooting a lot of extra current through it.

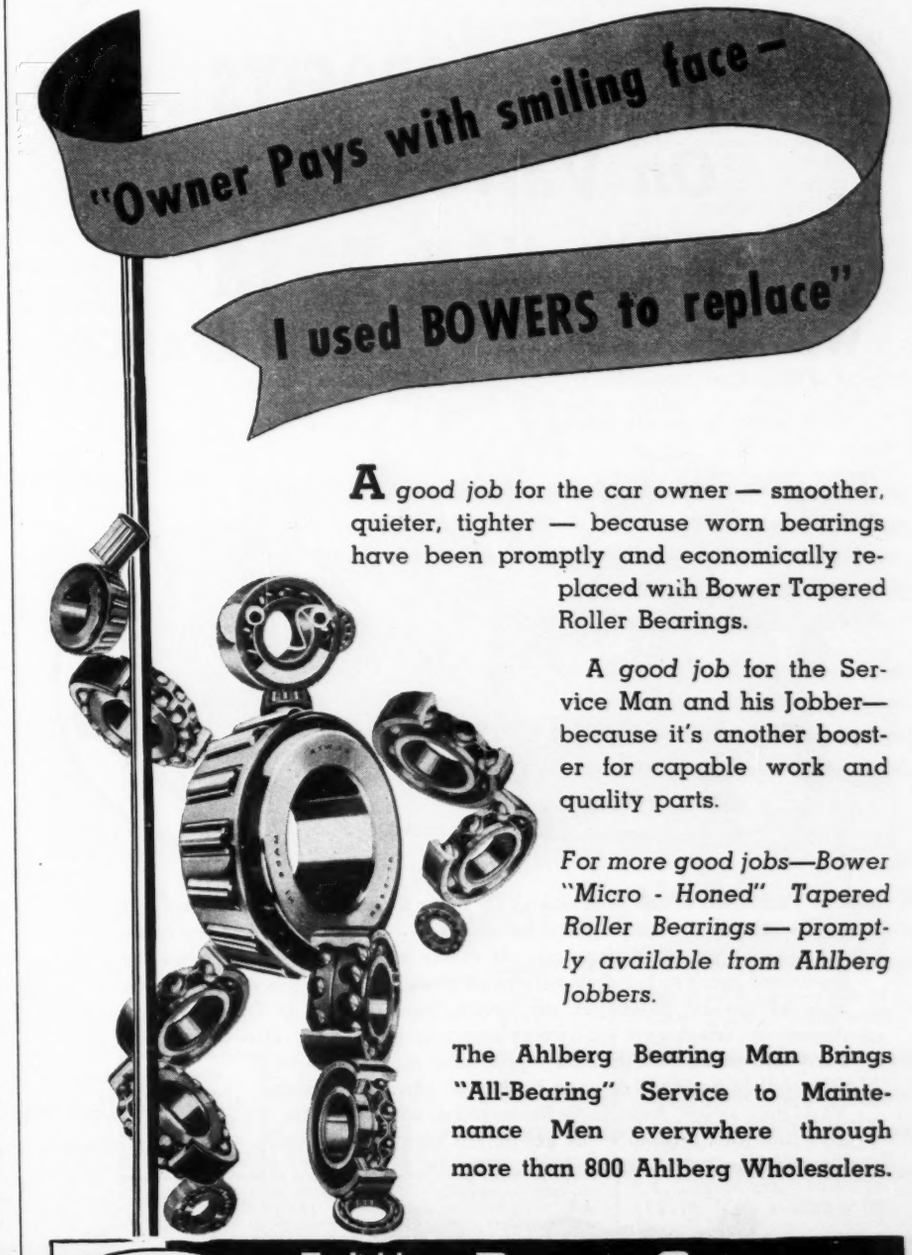
"When coils break down it is usually in the secondary winding. That's where all the voltage or electrical pressure is, and that's the part that must be extra well insulated if it's going to hold up and give service. There's perhaps as much as two miles of fine enameled wire in a good coil secondary, and to get it all on and make it efficient they are wound on a special machine that lays the turns even, just like silk thread is wound on a spool. At the end of each layer the machine stops and a layer of high-grade insulating paper is wrapped around the winding. Then the next layer is wound and insulated, and so on, until the full number of turns have been placed. It takes good insulation to hold secondary voltage and stop leakage.

"I've wondered about that," Harry Wilkins spoke up. "I've taken coils apart and all I could ever see was those insulators between layers. What I want to know is this: why doesn't the spark jump from turn to turn on the same layer? There isn't anything between turns but the enamel on the wire?"

"That's an easy one," Sam answered. "We'll say a coil puts out 15,000 volts and has 30,000 turns on the secondary winding. Now the voltage starts at zero at the beginning of the first turn and slowly grows stronger with each turn it passes through. If there are 30,000 turns to generate 15,000 volts it means that the potential, or difference in voltage, between any two turns that are next to each other is just one-half of one volt, and I think you'll all agree that one-half a volt isn't going to do much jumping. The enamel on the wire will take care of that without much effort. Between layers, however, it's a bit different. If there are 30 layers in the winding the potential between layers will be 30÷15,000, or 500 volts difference between layers in the coil. You have to insulate for 500 volts so that's why they have to put insulation betwen the layers of the winding, and it's got to be pretty good insulation, too."

Sam glanced at the shop clock. "I'll turn you boys loose in a minute, but first I want to get in a few words about those extra good coils we've got in stock. I've sold over 200 of them so far, and not a single comeback, so you know they must be good. Here's what makes 'em that way. Of course the material is all the best and the design is just right for the toughest service, but there's more to it than that. A lot of companies put out these extra good coils with about the same features. One feature is that they are better cooled than cheaper coils. Furthermore, they seal the coil in compound or oil so that the coil can't 'breathe' and suck in damp air to start corrosion.

"Heat is the worst enemy of a coil.



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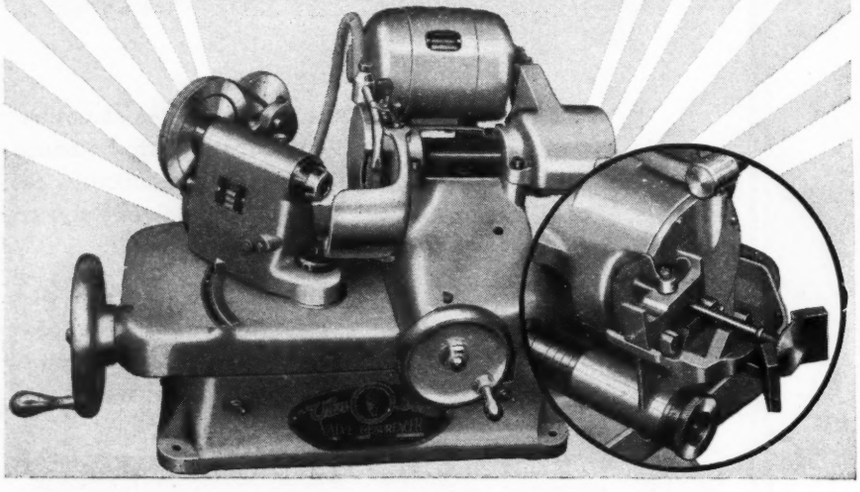
Out West it's PRECISION BEARINGS, INC. Los Angeles

Too much heat chars the insulation and causes premature breakdowns. Dampness comes next in putting coils in the junk box, followed by vibration and too high a voltage impressed on the primary. With a really good coil you don't have much worry with these things because they are built to take punishment. The fact is, when you sell a man a good coil you are doing everybody concerned a favor; you're helping a factory that has the guts to buck price competition and put out a quality article, you're giving the customer insurance against practically any kind of coil trouble, as well as better and more economical driving, you're making a better profit for me and building up your own reputation as a mechanic who knows his stuff and does one-way jobs—no comebacks. Just remember this, boys, you can't make good, rich ice cream out of nothing but skim-milk and sugar, and you can't get hot, snappy sparks out of a bum coil. You can kid yourself if you want to, but you can't fool the engine. Come on around the corner, fellows, the hamburgers and coffee are on me."

BOOSTS PROFITS
On Valve Jobs—
NEW VAN DORN
WET GRINDING VALVE RESURFACER



Put Van Dorn's New Wet Grinding Valve Resurfacer in your shop and you'll be able to handle more profitable valve jobs as fast as they come in! Van Dorn's Resurfacer grinds valves to factory-precision; has the *power* and speed to handle a volume of work. The 5/8" Resurfacer shown here grinds all passenger car, truck, bus, tractor or Diesel valves. Accessory attachment (shown in insert at extra cost) also wet grinds Ford and other "mushroom" type valve stems, tappets and rocker arms. Ask your jobber to show you how Van Dorn's New Resurfacer helps you to turn out valve grinding jobs *profitably*—or get details from Van Dorn Electric Tools, 727 Joppa Road, Towson, Md.

ONLY $9.75 *per month* **For this Resurfacer**

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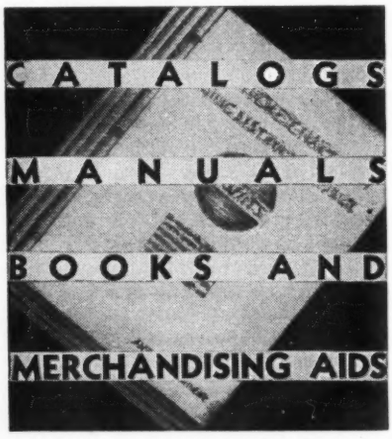
THE "RED HEADED" PORTABLE ELECTRIC TOOLS

Sealed Power Picture Stunt

Over 1,600 jobbers, manufacturers and guests at the A.S.I. Show held recently in Chicago had their pictures taken at the Sealed Power booth during the show, W. O. Banta, sales manager, has announced. The picture taking stunt, according to show managers, was one of the high spots of the show.

Every visitor was invited to have his picture taken. The visitor would then step behind a large gold frame in which were set ten manikins dressed in 1890 costumes. The visitor would then be given a brown derby or old time straw sailor and a false mustache. The picture would then be taken. The result was a photographic reproduction of one of Sealed Power's most famous 1940 advertisements, entitled "The Sealed Power Family Is Growing." A copy of the photograph is being sent to each visitor who participated in the stunt.



To receive a copy of the free literature mentioned in some of the following items, just check the square on the postcard on page 94 which corresponds to the letter given the literature you desire.

A New catalog of particular interest to the aviation field is the Aviation Cleaning Handbook issued by Magnus Chemical Co., Garwood, N. J. This handy manual covers cleaning solutions for washing airplanes, cleaning parts, cleaning the hanger floor, and other points. Your copy will be sent upon receipt of the post card, page 94, with a check in the "A" square.

A new handbook by the DoAll Co., 1201 Thacker St., Des Plaines, Ill., describes and explains the various types of narrow saws, shows how they are used and cutting speeds that should be employed on various materials. Of interest to anyone who works with metal cutting saws. You can get a copy by checking "B" on the post card, page 94.

Are You Missing a Bet?

EVER think of the extra profits you could be making if your shop were equipped to balance wheels? Practically every car that comes into your shop needs this service. L & H Balancing Weights are being installed to the tune of millions a year. Why not get your share of this business? Write and get the low-down! (Pat. No. 2036757.)

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- Electrical Service
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Glaseal Beam Foglite by Do-Ray

For safer driving in fog, snow, or mist. Chrome or black enamel—6½" in diameter, malleable iron bracket. Genuine G-E unit, white or amber lens. List price $5.00

Cash in on the popularity of Sealed Beam lighting with Do-Ray's new Headlamp. Genuine G-E unit. Fits all trucks with ball socket mounting. Stainless steel door, black enameled heavy steel body. Diam. 8¾" by 9" deep. Certified to meet I.C.C. rules. List $15.00 pr. (12-16 Volt available for Diesels.)

Do-Ray Lamp Co.
1458 S. Michigan Avenue
Chicago

Ask Your Jobber

DO-RAY
SAFETY LIGHTING AND REFLECTING DEVICES

Chain Installation Service

Partly as an added service and partly as a means of promoting additional safety, Chicago service station operators will put on tire chains for motorists for a nominal fee of 15 cents to 25 cents.

The announcement was made by B. M. Provis, president of the Gasoline Retailers Association of Chicago, following a study of safety recommendations made recently by the National Safety Council's committee on winter driving hazards. The committee report gave skidding on snow and ice and reduced vision caused by longer hours of darkness, snow and fog as responsible for a good portion of the normal 35 to 45 per cent increase in automobile accidents during the winter months.

Emblems

The automobile emblems which are illustrated on page 54, but which have the identification blanked out, are as follows: Reading top to bottom, Hupmobile, Dodge, Victory Six, Studebaker, Paige, Dort.

Aitkin-Kynett Appointed

The Aitkin-Kynett Company, Philadelphia, Pa., has been appointed to handle the merchandising-advertising account of the Motor Equipment Wholesalers Association.

Correction

In the December, 1940, issue of MOTOR AGE, an error appeared in the "Departmental Check List of Needed Shop Equipment," which was presented with the article, "Shop Equipment Expands Departmental Earnings," by Frank Tighe. Inadvertently, the needed equipment for Body Repairs and for Major Overhauling were placed under wrong headings. The correct listings are as follows:

MAJOR OVERHAULING

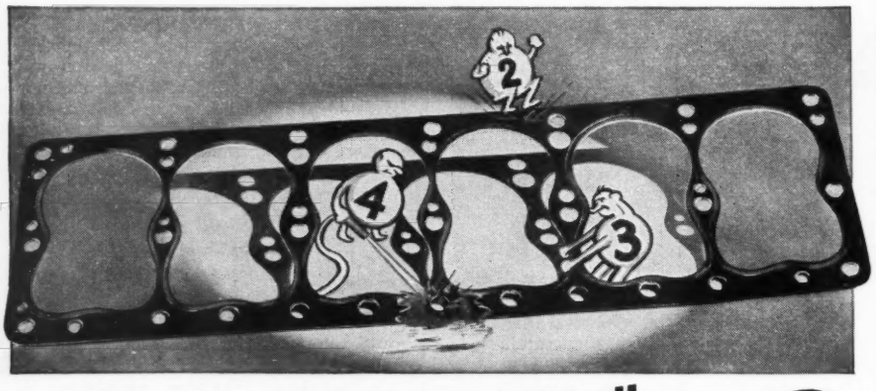
Engine, Clutch, Transmission and Rear Axle

Air compressor
Battery hydrometer
Bearing testing equipment
Bench arbor press
Bench grinder
Carbon scraper
Chain hoist
Clutch rebuilder
Connecting rod aliner
Crank pin reconditioner
Creepers
Cylinder gage
Cylinder reconditioner
Cylinder ridge cutter
Differential holding fixture
Differential pinion depth gage
Drill press
Dynamometer
Electric drill
Engine stand
Engine testing equipment
Fuel pump tester
Gear pullers
Hand tools
Horses; Jacks
Lathe
Lift or rack
Metal sprayer
Micrometers, inside and outside
Oil cans
Parts cleaning equipment
Piston expander
Piston heater
Piston pin hole conditioner
Piston ring compressor
Piston ring groove cleaner
Portable grinder
Power press
Pry bars
Radiator filling cans
Radiator flushing equipment
Radiator hydrometer
Radiator repair equipment
Rear axle stand
Spark plug cleaner and tester
Steel bins
Tension wrenches
Towing, wrecking equipment
Transmission dolly
Valve grinder
Valve keeper tool
Valve key replacer
Valve lapper
Valve lifter
Valve refacer
Valve seat reconditioner
Valve seat renewer
Valve seat tester
Valve spring compressor
Valve spring tester
Waste cans, floor brushes
Welding, cutting equipment
Wheel pullers
Work benches; Vises

BODY REPAIRS

Wheel Alinement, Frame Straightening, Spray Painting, Glass and Upholstery

Air compressor
Axle straightener
Bench grinder
Body and fender tools
Chain hoist
Creepers
Electric drill
Fender spreader
Fire extinguishers
Frame straightener
Glass installation equipment
Hand tools
Horses; Jacks
Lift or rack
Oil cans
Paint spray guns
Portable power straightening equipment
Portable sander and buffer
Power driven sheet metal straightener
Pry bars
Sewing machine
Solder spray gun
Steel bins
Striping tools
Towing and wrecking equipment
Trimmers kit
Waste cans, floor brushes
Welding, cutting equipment
Wheel alining equipment
Wheel balancer
Wheel straightener
Work benches; Vises



Before You Say—"They're All Alike"

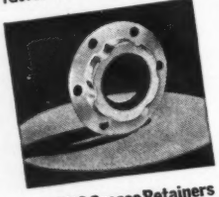
LOOK INTO

FEL-PRO GASKETS

PUMP PACKING and GREASE RETAINERS

FEL-PRO Gasket Sets
A complete line . . . many types of materials for every job.

FEL-PRO Pump Packing
Fits flush at once . . . makes installation faster and easier.



FEL-PRO Grease Retainers
Easily installed... no special fitting..accurate on all cars.

Gaskets may look alike . . . But—It's *performance* that must win car owner good-will, satisfy their requirements and bring in steady repeat business for you.

These are the FEL-PRO Gasket features that have won unqualified dealer approval!

1 Super-resilient—they seal without distortion.
2 Soft-Faced—conform to irregularities yet resiliency is confined to outer surfaces *where it is needed.*
3 Steel Center furnishes extra strength . . . assures uniform thickness and compressibility.
4 Special FEL-PRO Cement—prevents seepage between plys . . . assures a single bonded unit that is heat-proof and water-proof.
5 Uniform Construction—every FEL-PRO Gasket is *built* to meet today's high speed, high temperature and high compression requirements.

Every FEL-PRO *Product Embodies Distinctive Sales and Profit Making Features. Write for New Catalog and Confidential Distributor's Proposal. Address:*

FELT PRODUCTS MFG. CO., 1510 W. Carroll Ave., Chicago

FEL-PRO Gaskets
PUMP PACKING
GREASE RETAINERS

General Motors Latest and Greatest Style Success

Pontiac "Torpedo" Streamliner Sedan Coupe

. . . and Pontiac Dealers have it at the lowest prices of all!

CHALK UP *another* great selling asset for Pontiac dealers!

Everyone knows that General Motors scored the style scoop of the year with its brilliant new streamlined body design pictured above. And Pontiac dealers scored a *double* scoop by offering it at the lowest prices of all!

Yet this is only one of the many great selling advantages Pontiac is offering its dealers for 1941. Consider these: the greatest—and *fastest selling*—line Pontiac has ever built; a new "Torpedo" which is driving a deeper wedge into the low-price market every day; a more favorable price position than ever before; a choice of a Six or an Eight in any model for only $25 difference in price.

With all this, is it any wonder that Pontiac and Pontiac dealers have just closed their books on the biggest year in their history? Is it any wonder that Pontiac's percentage gain in 1940 over 1939 was greater than any other volume producer? Is it any wonder that 1941 looks like an *even more profitable* year for Pontiac dealers?

ARE YOU LOOKING FOR A NEW LOCATION ?
Are you looking for a new location? Are you dissatisfied with the line you are now handling? If you would like to consider a change of either your present town or your present line, or both, maybe Pontiac has just the set-up you are looking for.
Right now Pontiac has a few franchises—all of them representing potentials of 50 cars and up, available in scattered points in all sections of the U. S. Pontiac also has a few less-than-50-car points available. Each requires but a reasonable capital investment.
Why not write today and get all the details? Address your inquiry to the *personal* attention of Mr. D. U. Bathrick, General Sales Mgr., Pontiac Motor Division, Pontiac, Mich., and he will answer it *personally*.

Grey-Rock Makes New N.S.C. Schedule Available

Franklin A. Miller, replacement sales manager for Grey-Rock products has announced the adoption of the new National Safety Council Brake Servicing Schedule by the United States Asbestos Division, Manheim, Pa.

According to Miller, it was at his company's suggestion that the Council set up a committee of experts to prepare this schedule designed to determine whether brakes should be repaired or adjusted and the rendering of the service needed.

Grey-Rock offers all dealers the complete National Safety Council Schedule in the form of the plaque illustrated here. On the plaque is also the dealer's own pledge to follow the N. S. C. Schedule and use Grey-Rock Engineering Methods. This plan is designed to serve as a basis for better understanding between car owner and service station operator.

Miller states that the new National Safety Council Schedule is but part of a complete plan to insure more and better brake jobs for Grey-Rock dealers. The Grey-Rock dealers' new brake service plan will be nationally advertised in the leading magazines, and the dealers will be furnished with certificates which they give the car owner after each brake job showing just what work has been done and as a proof of their pledge.

The three-color plaque with the full N. S. C. Schedule as illustrated here, measures 11 x 14 inches and may be obtained free from any Grey-Rock jobber or by writing to Grey-Rock, Manheim, Pa.

NEW! NOTHING LIKE IT!

EASY-STARTING BLUE STREAK COIL

A SURE-FIRE PROFIT BUILDER

THE first coil with a built-in Precision Timer for EASY STARTING! Shoots a super hot spark to the motor for just long enough to start the car—and then drops to normal amperage.

Nothing to operate — completely automatic. Different! An exclusive patented Standard device. Another demonstration of Standard's engineering leadership.

A boon to the motorist with a chronic hard starting motor. Thousands of car owners will install this new coil to put an end to that trouble. Doubly welcome in cold weather. Gets engine action at below-freezing temperatures.

Furnished in a complete line for all popular cars.

If your jobber can't supply you, write direct to us.

STANDARD MOTOR PRODUCTS, INC.
Main Office and Factory
37-32 Northern Blvd., Long Island City, N. Y.

U. S. Patent No. 2,223,151

All "Blue Streak" Coils, including the New Easy-Starting type, are built with the new Triple-Protection WATERPROOF Top.

By the Manufacturers of
"BLUE STREAK" AND "STANDARD"
IGNITION PARTS
BATTERY CABLES
AUTOMOTIVE WIRE

MOTOR STANDARD PRODUCTS

"The ABILITY to serve well is as important as the WILL to do so."

Kellogg-American Announces Pledge to Service Field

Brochures and other literature, distributed at the Chicago A. S. I. Show and through the mails, feature "The new name on the horizon of pocketbook importance to the automotive equipment industry."

The new name, Kellogg-American, combines the titles of the Kellogg Division and its parent company, American Brake Shoe & Foundry Company. Designed into a trade-mark decalcomania, to be attached to Kellogg-American air compressors, hydropneumatic lifts, car washers and other company products, the new name marks the redesigning and improvement of the Kellogg line, backed by the research, the engineering and the financial strength of American Brake Shoe, a factory bulletin said.

A published pledge on policy, signed by president W. B. Given, Jr., of American Brake Shoe, and the Kellogg Division officials, president J. F. Weller and general sales manager H. O. Holland, obligates the Kellogg Division to design and build superior equipment calculated to increase the profits of automotive service stations and garages; to sell this equipment through automotive jobbers at attractive prices; and to stand squarely behind every Kellogg-American product, while keeping the entire line up to the minute through continuous research and development work.

Editor of Life Magazine To Address N.A.D.A.

Plans are taking shape for the 24th annual convention of the National Automobile Dealers Association to be held in Pittsburgh, Pa., January 20-23, 1941.

Henry R. Luce, editor of *Life* magazine, has accepted an invitation to deliver the principal address at the convention banquet in Pittsburgh, Wednesday evening, January 22.

On the program to discuss dealer relations will be Donald R. Richberg, former NRA administrator, who has been serving as special counsel for N.A.D.A. He will speak on the subject, "Unrestrained vs. Civilized Competition."

Among the guest speakers featured on the convention program is Arthur O. Dietz, president of the Commercial Investment Trust Corp., who will discuss "The Obligations of Management Under the Defense Program." The theme of the convention is "The Automobile Dealer's Responsibility Under the Defense Program."

Philip M. Klutznick, counsel of the Nebraska Automobile Dealers' Association, will speak on state legislative programs, and J. B. Van Tassell, business management consultant of the Chicago Automobile Trade Association, will discuss "Making Management Pay Dividends."

Lake Hays, counsel of Universal Underwriters, will be the speaker at the luncheon to be given to convention delegates by that organization. Howard V. Clark, a division sales manager of the Carnegie-Illinois Steel Co., will address the delegates at a luncheon to be given by the Pittsburgh Automobile Dealers Association, hosts of the convention.

In addition to the luncheons, special parties will be given by Commercial Investment Trust, Commercial Credit Corp., and the Nicholson Steamship Co.

New Passenger Car Registrations

	October 1940	September 1940	October 1939	TEN MONTHS 1940	TEN MONTHS 1939	Per Cent Change, 10 Months 1940 over 1939	Per Cent of Total Ten Months 1940	Per Cent of Total Ten Months 1939
Chevrolet	71,689	30,805	25,246	692,522	474,002	+ 46.0	24.92	21.79
Ford	41,761	13,771	34,500	441,523	390,206	+ 13.0	15.88	17.94
Plymouth	41,517	19,442	37,566	365,020	320,160	+ 14.0	13.13	14.72
Buick	32,283	20,186	23,522	238,804	167,547	+ 42.0	8.59	7.70
Pontiac	22,576	11,805	14,180	186,855	123,587	+ 51.0	6.72	5.68
Dodge	10,273	7,144	13,773	163,883	163,239	+ 0.3	5.90	7.50
Oldsmobile	18,627	9,083	13,188	159,629	112,835	+ 41.6	5.74	5.19
Studebaker	10,113	6,840	8,576	85,477	67,497	+ 26.7	3.08	3.10
Chrysler	6,486	3,069	6,183	78,994	58,078	+ 36.1	2.84	2.67
Hudson	8,044	7,156	8,240	67,694	46,513	+ 45.5	2.44	2.14
Mercury	4,759	2,821	4,321	65,577	51,755	+ 26.6	2.36	2.38
Packard	7,046	5,342	8,286	62,303	47,178	+ 32.0	2.24	2.17
De Soto	4,820	3,392	4,727	58,844	47,018	+ 25.0	2.12	2.16
Nash	2,534	2,182	4,283	42,262	44,429	− 4.6	1.52	2.04
Willys	1,418	1,386	1,864	17,990	10,810	+ 66.5	.65	.50
Lincoln	1,859	1,040	1,271	17,400	15,914	+ 9.2	.63	.73
La Salle	381	1,044	1,541	16,314	16,995	− 4.0	.59	.78
Cadillac	3,590	711	960	12,342	10,344	+ 19.3	.44	.48
Graham	201	206	142	1,526	3,552	− 57.0	.05	.16
Bantam	44	55	.....	745	.....	.....	.03	.....
Crosley	48	30	.....	369	.....	.....	.01	.....
Hupmobile	40	19	20	133	887	− 85.0	.....	.04
Miscellaneous	386	471	197	3,380	2,716	+ 24.5	.12	.13
Total	290,495	148,000	212,586	2,779,586	2,175,262	+ 28.0	100.00	100.00
Chrysler Corp.	63,096	33,047	62,249	666,741	588,495	+ 13.3	23.99	27.05
Ford Motor Co.	48,379	17,632	40,092	524,500	457,875	+ 14.5	18.87	21.05
General Motors Corp.	149,146	73,634	78,637	1,306,466	905,310	+ 44.2	47.00	41.62
All Others	29,874	23,687	31,608	281,879	223,582	+ 26.0	10.14	10.28

COUNT THE CYLINDERS

Multiple cylinders give you a compressor that runs cooler, more quietly, and saves on power cost. Multiple cylinders give you a compressor that pumps faster, cuts down operating time, saves on maintenance. PAR multiple cylinder air compressors cost no more to buy than old fashioned single cylinder outfits . . . cost far less to operate.

By Comparison — You'll Buy

PAR

MODERN EQUIPMENT CORP.
DEFIANCE, OHIO, U.S.A.

"HOW TO BUY AN AIR COMPRESSOR" . . . a fact-filled catalog and check list — is yours for the asking. Write for your copy today!

JOBBER'S DIGEST of the

HOW'S BUSINESS

A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

DECEMBER, 1940

NATIONAL TOTAL	Good	Fair	Poor
ACCESSORIES		**Fair**	
Abrasives	21	39	65
Anti-Freeze	89	10	3
Car Radio Sets	5	86	101
Car Radio Accessories	2	79	104
Chains	40	19	6
Heaters	90	32	14
Horns	18	48	31
Lacquers	5	41	29
Oil Filters	45	36	51
Oils and Greases	18	29	38
Polish	5	51	36
Seat Covers	10	38	46
Thermostats	84	20	14
REPLACEMENT PARTS		**Fair**	
Axle Shafts	12	70	45
Ball and Roller Bearings	43	27	64
Brake Lining	59	72	30
Bushings	12	70	19
Chains (Timing)	6	50	30
Clutch Plates and Parts	46	42	27
Fan Belts	70	30	14
Gaskets	75	61	2
Gears (Rear Axle)	10	62	48
Gears (Transmission)	13	51	29
Mufflers	101	47	7
Pistons	15	59	24
Pins	32	41	47
Rings	46	40	13
Radiators and Cores	6	30	40
Spark Plugs	92	58	7
Springs (Chassis)	19	50	30
Valves	40	52	21
Water Pump Parts	84	26	10
Engine Bearings	63	41	2

NATIONAL TOTAL	Good	Fair	Poor
SHOP EQUIPMENT		**Poor**	
Battery Charging Equipment	16	35	42
Car Lifts	1	21	67
Car Washers	0	18	99
Compressors	14	6	64
Drills (Electric)	18	40	29
Electric Testing Equipment	13	46	59
Jacks (Garage)	20	62	33
Lubricating Equipment	19	45	59
Paint Spray Equipment	1	46	51
Tire Service Equipment	5	27	46
Tool Kits and Sets	12	56	47
Valve Refacers	10	24	101
Wheel Aligners	7	27	52
Wheel Balancers	3	49	38
Safety Testing Equipment	0	48	60
Welding Equipment	3	41	37
TIRES		**Fair**	
Casings	12	36	9
Tubes	10	27	21
ELECTRICAL UNITS		**Good**	
Armatures	27	62	20
Batteries	82	36	11
Cable (Battery)	60	60	3
Coils	50	72	4
Other Ignition Parts	58	55	12
Fuses	28	81	30
Ignition Wire and Cables	57	59	14
Lamps	66	48	12

MOST ACTIVE LINES

POSITION OF LEADERS:	DEC. 1940	DEC. 1939	FEB. 1940
Mufflers	1	1	1
Spark plugs	2	6	5
Heaters	3	19	..
Anti-freeze	4	18	..
Thermostats	5	16	..
Water pump parts	6	5	10
Batteries	7	7	9
Gaskets	8	4	3
Fan Belts	9	8	12
Lamps	10	10	8
Engine bearings	11	2	2
Battery cables	12	9	13
Brake lining	13	15	15
Other ignition parts	14	14	11
Ignition wire & cables	15	17	16
Coils	16	..	17
Rings	17	3	6
Clutch plates & parts	18	12	4
Oil filters	19	11	7
Ball & roller bearings	20	13	14

HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.
Fair—Sales slightly above or below normal.
Poor—Sales noticeably below normal.

THIS digest is prepared to help you understand the job that MOTOR AGE *is doing for its readers. At the same time, you, too, can make the reading of* MOTOR AGE *doubly profitable by discussing its important articles in your daily contacts with the service trade:*

TRANSMISSION OVERHAUL

This up-to-the-minute step-by-step article simplifies the service procedure on the 1941 Studebaker transmission. It applies to all three lines, Champion, Commander and President.

FLAT RATING WHEEL ALINEMENT ON THE NEW NASH

Here is a step-by-step outline of the methods of setting caster, camber and toe-in on the new Nash with the Lancia type of wheel suspension. This is an entirely different type of construction from the conventional knee-action style, and your men will be able to discuss it, and see that their customers are equipped with the necessary tools to do the job.

TRACTOR SERVICE YIELDS A CROP OF $$$

This is a preliminary article designed to show servicemen the profits to be made in servicing tractors and when servicemen make profits so do jobbers. Subsequent articles will take up the servicing of various makes of tractors in detail.

IGNITION COILS ARE VITAL TO TUNE-UP

While everyone knows that ignition coils are a vital part of a good tune-up job, unfortunately many mechanics seem to forget this important fact when actually working on the job. This article serves to remind the mechanic of the underlying facts about ignition coils and should assist in increasing the sale of these all-important units.

January MOTOR AGE

1941 LOOKS very promising for readers of MOTOR AGE. All indications seem to point to another profitable service year, especially for those shops that are equipped to do a complete maintenance job.

MOTOR AGE helps its readers—the maintenance men of America—to do an all-inclusive service job. More and more automotive servicemen are depending on MOTOR AGE because it is published exclusively for them . . . its contents is right down their alley . . . it covers all maintenance subjects . . . it tells them how!

When servicemen make money, jobbers prosper in like manner. That's why the editors of MOTOR AGE want you to use this guide to greater service profits in your daily contacts with the men who service and maintain the 30,000,000 motor vehicles on our highways.

ADJUSTING THE PACKARD ELECTROMATIC CLUTCH

Here's an up-to-the-minute article on the adjusting procedure covering the new electromatic clutch used as special equipment on the 1941 Packard cars. Linkage adjustment, vacuum cylinder operation and solenoid testing are important points in the satisfactory operation of this equipment, with replacement instead of repair recommended when individual units are inoperative.

SPOT CLEANING

Outlining the materials needed for removing spots from upholstery, and how-to-do-it, furnishes the reader with information that will keep him out of trouble with his customers. Armed with this information, jobbers' salesmen can be of real assistance to their customers.

MOTOR AGE INDEX

The year in review, indexing by automotive unit the articles that have appeared in MOTOR AGE during the past year.

NEW SAFETY STANDARDS SIMPLIFY BRAKE SERVICE

A lot has been published in recent years on the general subject of safety. The National Safety Council now comes to the fore with recommended service and testing standards which, when followed by repair shops, will result in increased sales of brake lining, rivets, brake fluid, drums and brake servicing equipment.

SERVICING RADIAL ENGINES FOR NATIONAL DEFENSE

Closely allied with the automotive field is the radial engine, currently used in airplanes and tanks. MOTOR AGE presents the first of a series of articles written to familiarize the automobile mechanic with construction features and repair procedure covering the radial engine. A timely subject, and of interest to all.

TURRET TOP REPAIRS

With the rapid increase in passenger car registrations has come a corresponding increase in body repair work. Shops going into this lucrative field are in the market for larger compressors, body repair tools, painting equipment, power-driven tools, etc. This article tells how to repair a damaged top in the easiest and quickest manner.

TIRE LIFE FACTORS

Jobbers will be interested in this article which deals with tire inflation pressure, overloading and many other factors which enter this problem. Tire gages, governors, speed indicators and alining equipment are suggested as essential equipment in the fleet operator's shop.

TESTING FOR LEAKS IN WELDING EQUIPMENT

Points out the need for regular inspection of welding equipment to guard against leaking valves, hose connections, fittings, air lines and defective gages. Jobbers are the source of supply for these items, and should be able to use this article in their contacts with every shop having welding equipment.

WOMEN LIKE TO SPEND MONEY FOR SERVICE

There are 8,000,000 women drivers who are spending more and more automotive dollars each year. This article points out the preference women show in spending household funds. They choose the shops and service stations that are clean and attractive, and where service is complete from gas and oil to major overhauling.

AS ISSUE FOLLOWS ISSUE, MOTOR AGE DEALS WITH ALL BRANCHES OF SERVICE WORK AND ALL SUBJECTS OF DIRECT INTEREST TO SERVICEMEN.

Steady Growth in sales

For over a **Quarter Century** Cole-Hersee **Products** have enjoyed a healthy growth in sales. Why? because Cole-Hersee Products are built up to a standard -- not down to a price. For all around Heavy Duty work you can depend upon Cole-Hersee **Products**

Cole-Hersee **Products** are Accepted Standard by Leading Truck and Trailer Manufacturers. DEMAND Cole-Hersee products from your jobber

Cole-Hersee Company
54 OLD COLONY AVENUE BOSTON, MASS

BOOST YOUR PROFITS WITH A FOREMAN BATTERY BOOSTER

Charges Batteries QUICKLY
• SAFE AND SIMPLE •

Motor-generator type, assures long life with low upkeep cost. Foreman Battery Booster plugs into standard sockets and does job in 40 minutes without removal of battery. Protected by Automatic Time Switch and Automatic Cutout Relay. Only 3 to 5 cents current cost per charge. Earns extra profits while car is being greased or serviced.

MODEL "A" 75 amperes
$147.50

Also available in Streamlined enclosed Model "D" $176.50. Ask for Bulletin or See Your JOBBER.

W. D. FOREMAN
5359 S. State Street
Chicago, Illinois, U.S.A.

MONEY-MAKER for
SERVICE STATIONS
PARKING LOTS
REPAIR SHOPS
USED CAR LOTS
DEALER SERVICE
FLEET OWNERS

FOREMAN BATTERY BOOSTER

...this is YOUR OAKITE CLEANING QUIZ!

How are greasy floors cleaned without hard scrubbing?

Thousands of garages and service stations have found the answer to this by cleaning floors with that SAFE, fast-working material . . . OAKITE PENETRANT!

No hard scrubbing is needed. That's because the remarkable penetrating action of this material quickly softens stubborn oil and grease deposits. A short soak followed by hose rinse . . . and your floor is CLEAN . . . safe to walk on. Write for FREE 36-page booklet giving complete data on this many-purpose, money-saving material.

Manufactured only by

OAKITE PRODUCTS INC., 24C THAMES ST., NEW YORK, N. Y.
Representatives in All Principal Cities of the U. S. and Canada

OAKITE *Certified* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

GET THE FULL CASH VALUE FROM Your TUNE-UP SERVICE

NIEHOFF CURRENT VOLTAGE RESISTANCE UNIT

MODEL T-16

Makes Every Voltage Regulator and Generator Test

Tune-up profits come faster and easier with this multi-purpose tester that accurately checks generator charging rates, field currents, regulators, relays and simplifies adjustments. It detects high resistance connections and indicates all load readings. Has attractive etched Aluminum panel and Grade "A" meters. Ask your Jobber's salesman TODAY or write for full details.

BRANCH: 1342 S. Flower St., Los Angeles, Cal.

C. E. NIEHOFF & CO.
4919 Lawrence Ave. Chicago, Ill.

THE PERFECT TEAM

PREPARAKOTE AND DULUX

REG. U. S. PAT. OFF.

The Primer That FILLS *and* The Finish That LASTS!

PREPARAKOTE is a ready-to-use, quick-drying primer with maximum adhesion qualities. It *fills;* can be sanded easily (dry sanded in four hours for color coats); holds firmly even on "hard to finish" jobs. Successive coats may be applied without "flashing" between coats. Saves you time and labor.

DULUX combines brilliant beauty with unusual durability. Highly resistant to chipping, traffic gases, greases, oils, weather. It saves time, cuts labor costs because it needs no rubbing or polishing, owing to its high initial lustre. You can do better jobs on all types of bodies *faster* with DULUX.

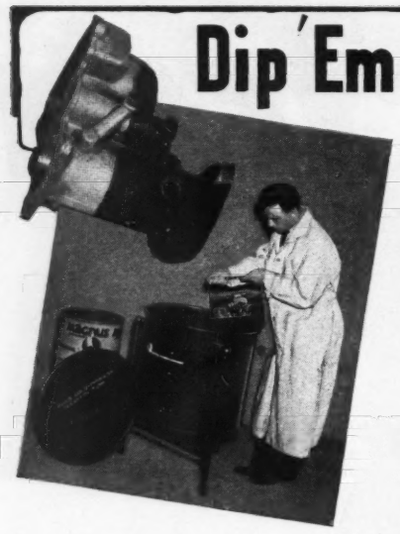
E. I. DU PONT DE NEMOURS & CO. (INC.)
REFINISH SALES • WILMINGTON, DELAWARE

DU PONT
REG. U. S. PAT. OFF.

REFINISHING MATERIALS

Dip 'Em In...Soak...Rinse.

THAT'S ALL...FOR PERFECT CLEANING!



You don't need a hot solution. You don't have to use lots of elbow grease, or dangerous solvents. Get oil, dirt, carbon, soot, "lacquer" paint and *all* the dirt off your carburetors, fuel pumps, pistons and other small parts with

MAGNUS COLD TANK CLEANER

It works at room temperature—quickly—thoroughly. It gets down inside to all openings and crevices. The dirt is penetrated down to the metal, loosens and soaks off. Flushing with a water jet gives you metal as bright and shiny as new. Very little brushing is ever required. Magnus Cold Tank Cleaner gives you better cleaning at much lower overall cost. You use it over and over again without building up sludge in the tank. And, it's harmless to all metals as well as gaskets and packings.

ASK FOR PERFORMANCE DATA

on Magnus Cold Tank Cleaners. It's worth studying.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

174 South Avenue Garwood, N. J.

MAGNUS CLEANERS

MILES of SMILES

WHEN YOU USE GENUINE TIMKEN BEARINGS

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Make Big Profits on Small Investment in

SHURHIT IGNITION PARTS

Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts . . . Contact Points . . . Condensers . . . Rotors . . . Caps . . . Coils . . . Switches, etc.

SHURHIT PRODUCTS, INC.

Waukegan, Ill.

Phila. Associations Merge

The Philadelphia Automobile Trade Assn., city-wide dealer body, and the Automotive Service Association of Phila. will become one association this month. By a change in the P.A.T.A. by-laws, the service group will have representation on the P.A.T.A. board.

Joint annual meeting of both associations is planned for the middle of January, at which time officers will be elected and 150 service associates inducted into membership.

Perfect Circle Dividend

The directors of The Perfect Circle Co. declared the regular quarterly dividend of 50c per share on the 162,500 shares of outstanding capital stock of the company on December 5. The dividend is payable Jan. 2, 1941, to stock of record at the close of business Dec. 16, 1940.

Plant Additions Completed

The K-D Lamp Company, Cincinnati, Ohio, has completed extensive additions to its plant. Factory announcement said that this was made necessary by consistent increases in volume and certain improvements and additions to laboratory, engineering and production departments. Offices have also been enlarged to take care of the added personnel made necessary by the growth in sales and production.

* * *

The United States, with 3,065,000 miles of highways, has a road mileage nearly three times as great as the total road mileage of England, France, Spain, Portugal, Germany and Italy combined.

Handy **SUPER SERVICER**

Complete, FAST BATTERY SERVICE

HANDY SUPER SERVICER is a combined Tester, Booster and Quick Charger. Compact. Portable. Tests battery in 1 min.; charges FAST and SAFELY without removal; charging rate, 75 amps.; 115 or 230 volts. (Specify voltage when ordering.)

$180.00

Complete with Bulbs, Leads and Clips.

ASK FOR BULLETIN 85

BALDOR ELECTRIC COMPANY

4375 Duncan Ave., ST. LOUIS, MO.

NEW SpeedWay 1/2" No. 89 DRILL

Full size, full weight, full capacity. Specially wound, high torque 115 V Universal 500 r.p.m. SpeedWay Drill Motor. Forced air cooling, oilless bearings, new natural grip breast plate and removable side handles. Streamlined die cast case. If your dealer can't supply, order direct on 10 day trial.

$24.50

Circular Free

SpeedWay Mfg. Co., 1880 S. 52nd Ave., Cicero, Ill.

FOR THE OIL GASOLINE & WATER CONNECTIONS

VELLUMOID

VELLUMOID VELLUMOID VELLUMOID

VELLUMOID GASKETS

Keep a few yards of VELLUMOID on hand, and quickly cut or tap out Quality Gaskets as you need them. You can rely on VELLUMOID.

Sold through Jobbers. The Vellumoid Co., Worcester, Mass.

"My Dad works over at the Main Garage and he says Kester Solders can't be beat for doing good work."

The boy's right—and so is his Dad! Kester Solders insure the best repairs. And the best repairs bring customers back to your shop for more of the same.

Kester Body Solders, cored and solid, feature a longer working range, ideal for either spraying or paddling.

Kester Radiator Solder has a special, more active flux and a free-flowing alloy for perfect radiator work.

Kester Rosin-Core Solder contains a non-corrosive flux that insures good workmanship on all electrical circuits.

Kester Acid-Filled Solder is the famous, all around, general purpose solder that good mechanics have relied on for years.

For high-grade workmanship, standardize on these Kester Solders for every job. Order from your jobber.

KESTER SOLDER COMPANY

4242 Wrightwood Avenue Chicago, Illinois

Eastern Plant: Newark, N. J. Canadian Plant: Brantford, Ont.

KESTER SOLDERS
FOR EVERY AUTOMOTIVE USE

COMMERCIAL CREDIT
Introduces the
AUTOMOBILE RECONDITIONING PLAN

to bring millions of dollars of new business to shops and service stations from coast to coast

Here it is—the national time payment plan for automobile reconditioning jobs—by the company that introduced the Automotive Equipment Plan to the Automotive Industry. Thousands of shop owners will leap at this chance to swell service volume with sizable reconditioning jobs instead of minimum, patch-work repairs. Be the first in your territory to offer ARP terms. Do a cash business with the customers who need time to pay. Fix the name—ARP—in your mind. Ask your jobber how to make arrangements.

ARP

Commercial Credit Corporation

Ask your Jobber
MOTOR MASTER PRODUCTS CORPORATION
4757 Ravenswood Ave., Chicago, U.S.A.
Export Distribution
BORG-WARNER INTERNATIONAL CORP., Chicago

PRATT
TAPERED ROLLER BEARINGS

The Perfect Replacement Line for all makes of

- Passenger Cars
- Trucks
- Buses
- Tractors
- Farm Machinery

Recognized as the Standard Replacement Bearing by Jobbers and Servicemen everywhere.

ESTABLISHED 1893

WM. E. PRATT MFG. CO. JOLIET, ILL.

NEW! ANNOUNCING VALLEY SUPERDUTY CHARGERS

Fully Guaranteed for Two Years — Valley, modernized superduty chargers will give you the utmost in value . . . enable you to cash in on the big profits in battery charging. Valley chargers are easy to operate . . . no moving parts . . . connecting to the lighting circuit. Low in operating cost.

Model SG-12 charges 1 to 12 6 volt batteries—$28.00.

Valley Electric Corp.
4221 Forest Park Blvd. • St. Louis, Mo.

A.E.A. Sponsors Nationwide Educational Conference

The Automotive Electric Assn. has announced its sponsorship of a series of product information programs to be held in principal cities throughout the United States. The program for each city will be conducted by the personnel of eight participating manufacturers who are members of A.E.A. They are, Bendix Products division of Bendix Aviation Corp., Briggs & Stratton Corp., Carter Carburetor Corp., Sterling Cable division and the Electric Auto-Lite Co., Trico Products Corp., USL Battery Corp., and American Bosch Corp.

Each program will last for two days, during which time the manufacturers will have the opportunity to present the latest merchandising and servicing information regarding their products. Those invited to these meetings include service station operators, dealers and their personnel from the distributing area surrounding the city. The opening session of this program will be held in Oklahoma City, February 5 and 6.

In discussion of this A.E.A. sponsored activity, F. B. Willis, president of A.E.A., said, "A cooperative effort of this nature, carried on by a group of manufacturers, indicates that the day when such manufacturers considered their plans as trade secrets to be withheld from each other has definitely passed. These manufacturers, in keeping with the basic purposes of A.E.A. are anxious to contribute to the technical service, and merchandising knowledge of automotive dealers and service stations throughout the country. It is felt that a better knowledge of the products and of the service procedures affecting them is the most important single contribution that can be made to the mutual benefit of factory and dealer groups."

Sidener and Van Riper Named

Sidener & Van Riper, Inc., Indianapolis advertising agency, announce the following new accounts: Allied Motor Parts Company, Detroit, Mich. (automobile pistons, piston pins, valves, valve springs and miscellaneous motors parts); Buffalo Pressed Steel Company, Inc., Youngstown, Ohio (automobile mufflers and tail pipes).

Play Safe! Use Only

PURITAN
The Genuine REFILL BRAKE FLUID
Mixes with ALL Others
Distributed through N. A. P. A. Warehouses

Buy AT THE Sign OF THE LION

Your Guarantee of Dependable Quality Automotive Parts, Supplies and Accessories

•

Write for our New 1941 Muffler Catalog.

LION AUTO PARTS & MFG. CO., INC.
1920 S. Michigan Ave., 2214-20 Main St., 1239 Osborne St.
CHICAGO DALLAS MONTREAL

YOU'LL NEVER KNOW

● THE PROFIT OPPORTUNITY in Fitzgerald Gaskets until you handle them.

THE FITZGERALD MFG. CO., TORRINGTON, CONN.

FITZGERALD GASKETS

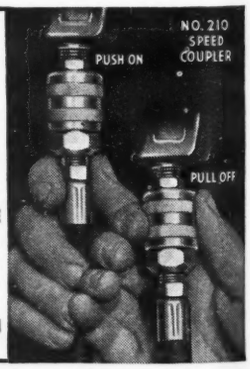
SPEAKER MATCH PATCHES

Build YOUR reputation for GUARANTEED Tube Repairs! SPEAKER MATCH PATCHES are built for GUARANTEED performance that makes satisfied customers and increases profits. Hermetically sealed in moisture-proof Pliofilm. Keeps "cooky" factory fresh. Wick fuse lights fast. Order MATCH PATCHES . . . The Quality Tube Repair . . . at your Jobber TODAY!

J. W. SPEAKER CORPORATION
1661 North Water St., Milwaukee, Wisconsin

ARO

SPEED COUPLER
Makes Each Air Hose Do Multiple Duty
FAST • DEPENDABLE
Ask Your ARO Jobber!
THE ARO EQUIPMENT CORPORATION
BRYAN, OHIO



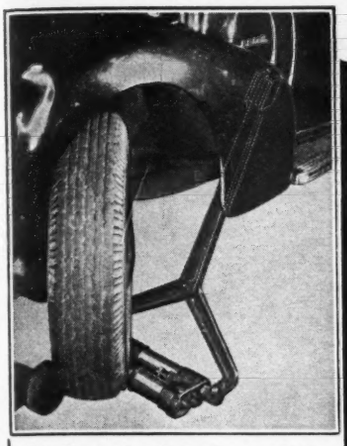
YOU CAN'T BEAT Signal-Stat

BURN-OUT PROOF SWITCH & DIRECTIONAL LAMPS

PAT. PEND.

Advertised in Commercial Car Journal & Fleet Owner

SIGNAL-STAT CORPORATION
68 JAY STREET BROOKLYN, N. Y.

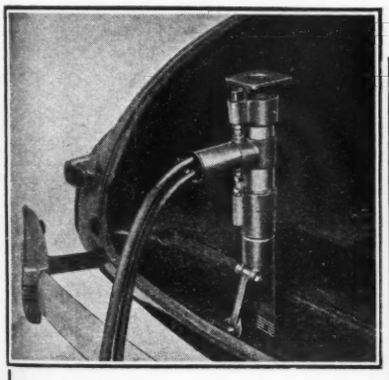


Modern Fenders Demand It

The H-289 Perfection Power-Plus

UNIVERSAL FENDER SPREADER

for close work where wide spreading is necessary and for spreading between fender and fender well. It pays for itself on the first six jobs. Closes to 1¾" and opens to 19¾" with 6" ram travel. Price $14.75.

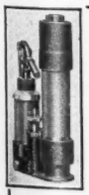


Power in a Small Area

H-80 Perfection Power-Plus

PUSH-PULL SPREADER

For use only with Perfection Push-Pull Jack. Ideal for trunks, pushing out sills, etc. Will fit into 1" space. Open width 5½". Price $8.50.



Perfection Power-Plus

HYDRAULIC JACK

The only double-acting PUSH-PULL hydraulic jack supplies direct pull, for the repair of box channels, rear trunk racks, door posts, etc.
Two units handle any type of body aligning, frame work, fender straightening, knee-action adjustment, steel running board straightening.

- Fills 100% with any amount of handle travel.
- Swivel handle allows operation in any position, even upside down.
- Immediately adjustable.
- Safety valve prevents overloading, bending or breaking.

Order from your jobber or write for catalog

G. A. C. MFG. CO., Ashland, Ohio

"Ripe Tomato Acceleration" To Help Sell Overhauls

"Ripe Tomato Acceleration" is the attention-arresting phrase, around which American Hammered Piston Ring division of Koppers Co. has built the most comprehensive advertising and selling program in its long history.

"The trade has long needed a single phrase that would tritely describe the need of a motor overhaul job and, at the same time, arrest the car owner's attention in such a way that he would be receptive to a detailed explanation of all the causes of the effect that brought him into the shop," explained Latimer Ford, American Hammered sales manager. "In 'Ripe Tomato Acceleration' we have given such a phrase to the thousands of repairmen upon whose ability to sell complete motor jobs depends, to a large extent, the prosperity of both parts jobbers and manufacturers, as well as their own.

"Oil and gas savings are important, of course, but the car owner gets an acute pain in the neck when he steps on the accelerator and nothing much happens.

"Most repairmen know that the causes of such are many—not just a single cause. Therefore, when they tell the car owner he 'needs new rings', they tell him a half-truth which, in many cases, results in comebacks and owner dissatisfaction. They need to sell him on letting them check all of the motor's wear parts and correcting those that need it.

"Ripe Tomato Acceleration" was announced simultaneously by American Hammered's 1,800 jobbers throughout the United States and Canada on January 2. It furnishes the central theme for advertisements appearing in most of the January trade papers and is backed by a mass of display, hand-out material and direct mail for both Jobber and Dealer use.

With its "Ripe Tomato Acceleration" campaign, American Hammered enters its fourth sales year without change in its well-known automotive set-ups—"Re-Ring," "Re-Bore," and "Re-Claim"—and Koetherizing, which had its Fifth Birthday last month.

A PERMANENT SEAL with . . .

PAX-WELD

A few minutes work and cracked valve ports, cylinders, water jackets and aluminum heads are sealed permanently with PAX-WELD, without taking down the motor. Follow directions for guaranteed results.

See your jobber or write TODAY!

JOHN S. McKENZIE
Rutherford, New Jersey

FOR MAKING BLACK TIRES WHITE

Whiz WHITE TIRE COATING

AND KEEPING WHITE TIRES WHITE

The Patented

WHITE, LIQUID RUBBER THAT S-T-R-E-T-C-H-E-S

Will Not Crack, Chip, or Peel
Easily Applied With Brush . . .
Dries in 20 Minutes

Made solely by
R. M. HOLLINGSHEAD CORP.
Camden, New Jersey

SOUTHERN
FRICTION MATERIALS CO.-CHARLOTTE, N.C.

KEX TIRE PLUGS

Dynamic hole stoppers for punctured casings. Add months of mileage to tire service life.

Sealing stems —¼"—⅜"—5/16".
Patch heads—2¼"—4".
Automotive Wholesalers sell KEX.

Stem compressed in needle point metal quill for easy insertion.

The Wedler-Shuford Co., St. Louis, Mo.

The "KING" FAST Battery Charger will make you MONEY!

YOUR CUSTOMERS WANT FAST CHARGING

●

SOLD ON DEFERRED PAYMENTS

●

There is a definite demand for FAST charging, and that is why the "KING" FAST Battery Charger will bring you business and make you money. It will charge one battery in the car and can also be used for charging a line of batteries in the regular way. Charging may be done while car is being lubricated, washed, or in for repairs. It will charge one battery at an 80-ampere rate, tapering off. The rectifying element is the efficient long-lived copper sulphite type and will give years of satisfactory service. An ammeter permits setting at correct charging rate, and a voltmeter is for testing batteries before charging. An accurate time switch shuts off charger at any desired time up to 60 minutes. The cabinet is a beautiful modernistic job with chrome trim. Only requires 18"x20" floor space. The "KING" FAST Battery Charger will enable you to give better service,—it sells for $178.00 complete.

Battery Operated "KING" CAM ANGLE TESTER $25.00

The 'KING" Electronic Cam Angle Tester, Type CA-4, is self-contained, battery operated, requiring only two connections to the car. It enables you to test and adjust distributors quickly and accurately. Answers are easy to read because dial has only one scale. It will give accurate readings at ANY SPEED and will not vary more than one degree from idling to top speed. Voltage range will not affect readings. Tests may be made with starter cranking engine and with distributor cap off. It is the only positive way of setting breaker points.

Ask our Jobber or Write us Jobber's Name

The ELECTRIC HEAT CONTROL Co.
9123 INMAN AVE. CLEVELAND, OHIO
KING-Good Products Since 1914-KING

N.A.P.A. Annual Meeting

The annual meeting of the National Automotive Parts Assn. and its associated manufacturers was held in Chicago, December 9 and 10.

All of the officers and directors of the association were reelected for 1941. The officers are as follows: President, Carlyle Fraser, Atlanta, Georgia; vice-president, Ralph W. Boozer, Indianapolis; vice-president and general manager, Henry Lansdale, Detroit, Michigan. Members of the Board of Directors include Lansdale, Fraser, and Boozer with A. F. Baxter, Buffalo, N. Y.; C. C. Colyear, Los Angeles; W. W. Martin, Pittsburgh; E. S. Baldwin, Columbus, Ohio; E. K. Moseley, Richmond, Va.; and J. R. McCoy, Philadelphia, Pa.

In his annual report to the organization, Henry Lansdale, general manager, announced that the year 1940 had broken all previous NAPA records, making it the biggest year in NAPA history, and forecast continued and further progress during 1941.

Among the high spots of the year was the series of 21 Regional Conferences held throughout the country.

The year also saw the inauguration of the NAPA "Assurance of Quality" Seal, by which all products distributed by the National Automotive Parts Assn. are now identified. Coincident with the adoption of the seal, a broad advertising program was launched in leading automotive trade publications explaining the meaning of the seal, as well as the purposes and functions of NAPA. The advertising program will be continued and broadened in 1941.

In a meeting held at the same time, the Manufacturers' Council of the National Automotive Parts Association elected the following officers and directors: H. W. Clough, Belden Manufacturing Company, chairman; C. E. Hamilton, Automotive Gear Works Inc., vice-chairman; Al A. D. Smith, Grapho Products Inc., secretary-treasurer; C. Q. Smith, American Brakeblok Division, American Brake Shoe & Foundry Company; C. G. Wood, Monmouth Products Company; C. F. Conn, Trico Products Company; W. M. Stuart, Martin-Senour Company; and J. E. Echlin, Echlin Manufacturing Company.

TRADE MARK NOC-OUT HOSE CLAMPS — THE HOSE CLAMP WITH THE THUMB SCREW

For fast, dependable hose connections, use NOC-OUT Hose Clamps . . . standard in the automotive industry for many years for their leakproof, trouble-free sealing features. Quick tightening thumb screw provides equal pressure all around. Type "A" Adjustable . . . fits many hose sizes. Type GBB heavy duty, solid band for Booster Brakes. G8HH for all heater hose. Type HP for all high pressure air and gas lines.

Sold by dealers and jobbers everywhere.

WITTEK MFG. CO.
4305 W. 24th PL., CHICAGO, U.S.A.

OUTSTANDING

performance in the Automotive Industry

SKF BALL AND ROLLER BEARINGS

Best known WEED AMERICAN BAR-REINFORCED TIRE CHAINS Easiest to sell

THE DE LUXE HORN

BUELL AIR HORNS

Increases driving security through certainty of being heard.

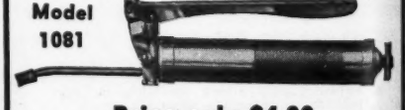
SOUND RANGE 1 TO 10 MILES
THE LIFETIME HORN
Write for literature.
BUELL MANUFACTURING CO.
2973 Cottage Grove Ave., Chicago, Illinois

For exclusive features, for higher profits, sell the battery with Plate Lock!

VESTA BATTERIES

New LINCOLN KLEENSEAL LEVER GUN

Model 1081



Price only $4.00

Ask your Lincoln jobber salesman, or write us for details on Model 1081 and other items in complete line which includes hand guns, lever guns, air and electric operated lubricant dispensing units, and full line of grease fittings.

LINCOLN ENGINEERING COMPANY
General Offices, St. Louis, Mo.